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THE
SERVICE SKETCHING CASE
AND
NOTE BOOK.

BY
LIEUT. W. W. NORMAN,
D.S.O.



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**THE SERVICE
SKETCHING CASE AND NOTE BOOK.**

GALE & POLDEN'S MILITARY SERIES.

THE SERVICE SKETCHING CASE & NOTE BOOK,

*For the use of Officers on Outpost and
Reconnoitring Duties.*

BY

W. W. NORMAN



PRINTED AND PUBLISHED BY

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1891.

PREFACE.



This book has been especially designed for the use of officers engaged on Outpost and Reconnoitring duties. At such times officers are expected to carry with them a pocket book for ordinary notes, another for writing field reports, and in addition, instruments for making sketches. It has been my aim to combine all the above in one book.

The sketching board is of a size to allow of a fairly large sketch being made even to a scale of 6" to the mile, but 4" to the mile will be found the most convenient scale to work with. The board may be used with the compass, in the same manner as the plane-table or cavalry sketching case, or an eye-sketch may be made without instruments, a few hints for this method being given among the memoranda. In using the ruler rough sight-vanes may be formed by sticking pins or matches into the holes at either end. Drawing paper and field report forms for refills may always be obtained from the publishers.

The Data in the memoranda are taken from various reliable books such as :—

The Text book of Military Topography. Major Hutchinson's Military Sketching. Col. Schaw's Defence and Attack of Positions and Localities. Text books on Military Engineering. De Brack's Light Cavalry Out Posts. Soldier's Pocket Book, etc., etc., etc.

W. W. NORMAN, *LIEUT*
2nd Punjab Cavalry.



MEMORANDA.

BIVOUACS.

In selecting a place for bivouac, circumstances must decide whether safety or repose is the greater consideration. In the former case the site should be difficult of access to the enemy, with easy egress for oneself. Deficiency of natural defence to be compensated for by extra patrolling. In the latter case, a site should be chosen where forage, provisions, fuel and water, are near at hand, and also in bad weather, shelter for men and horses. Grass should be carefully stored and covered to keep off rain. Tired horses have seldom any appetite, so fodder should be given in very small quantities, otherwise they will spoil what they don't eat by trampling on it.

The following is a good method for picketing horses in loose or sandy soil. Scrape away the loose superficial layer of earth and in the firmer soil dig a hole about 1' or 1' 6" deep and about 4" square ; at the bottom of the hole, on the side nearest the horse, scrape out a small recess about 4" long. Tie a large knot at the end of the rope and place this in the recess and ram the earth back carefully. This will hold in soil where pegs are of no use.

On a loose sandy plain in severe weather, a man may escape the cold by scraping a trench and burying himself except his head. It is unwholesome to sleep rolled up tightly in a waterproof sheet. Where there is straw, grass, leaves, heather, rushes, &c., available, part may be arranged as a bed for the party, who lie in a row, their blankets are then spread over them, and then more heather, &c., strewn on the top by one of

the party, for whom a place is kept, into which, last of all he crawls.*

If the supply of water be from a small spring, the spring should be opened out and surrounded by a low wall of puddled earth, in order to collect the water and also to prevent it getting dirty. In hot weather a screen of heather, grass, &c., should be made over the spring; this keeps the water clear and cool, and checks evaporation. Water may be purified by boiling. Charcoal, alum, and also tea leaves are good for removing organic matter. Charcoal can very quickly be made by sinking a small pit, in which a fire should be made and kept burning fiercely until the wood is reduced to embers, then cover it over with the excavated earth, and allow the embers to cool.

CAMPS.

The Military Considerations in selecting the Site for a Camp are abundance of provisions, forage, fuel and water: proximity to road along which the troops are marching. Villages, defiles, rivers, and all other obstacles should be in rear in order that they may not interfere with the next day's march. If in the presence of the enemy, the site should not be commanded by any higher ground, and troops should be encamped on ground suitable for their action.

Sanitary Considerations deal with the healthiness of the site. The following places should be avoided—Irrigated or marshy banks of rivers, brushwood, forests lately cut down, newly ploughed fields, ravines, water-courses, graveyards and old camping ground; get as far as possible to windward of the two latter.

The banks of a river if not irrigated are sometimes less malarious than the low hills around. Where fine

*Temporary shelter from extremes of heat and cold, or from rain, may be obtained in various ways by forming screens of hurdles, branches of trees, straw mats, &c.

turf and large trees are found, the site is generally healthy, also sandy and gravelly soils.

ROAD RECONNAISSANCE.

Marginal information on the Sketch. Mileage should be marked by short red transverse lines numbered from the starting point. Cross roads with distance in miles to nearest village or town. Nature of fences at various points and places where troops could leave the road and march in the fields. Positions, tenable by advanced or rear guard. Conspicuous objects. Woods, nature and extent. Dimensioned sketches of bridges.

General Report.

Roads.—Metalled or not, width between fences, and of metalled portion, materials for repair, present condition, steepest gradients.

Defiles.—Nature and extent of mountain gorges, narrow valleys, viaducts, cuttings, bridges, &c.

Open places.—Where troops can form up or pass without interfering with the march of other troops.

Lateral Communications.—Where they lead to, condition and construction.

Bridges.—Of what materials composed, capabilities of bearing weight, width of road-way, dimensions of arches, spans, etc., method of hasty demolition, materials for repair, &c.

Camps, Bivouacs, or Halting Grounds.—State force for which suitable, healthiness, whether lately occupied by other troops, proximity of supplies, &c.

Water.—Supply available and quality.

Rivers.—Breadth, depth, velocity, means of crossing, command of one bank over the other, &c.

The Country.—Nature of, on either side of road. Whether marshy, dry, wooded or open, character of fences and cultivation, facilities for movement across country or parallel to road, view whether restricted or not, &c.

Towns and Villages.—Short description of ; capabilities for defence ; houses, of what material composed details of any strong, spacious buildings, such as churches, &c., post and telegraph offices, shops, workshops, supplies of water, provisions, forage, fuel, &c.

Positions.—Remark on those tenable by friend or foe.

Railways.—Short account of any in the vicinity of the road, state whether troops could march along the line.

Telegraphs.—Number of wires.

Woods.—Nature and extent, roads, paths, clearings, streams, hollows, &c., nature and dimensions of timber and brushwood, outlying clumps, nature of soil, description of fences and ditches by which bounded.

Marshes and Swamps.—Nature and extent, how crossed.

Landmarks.—Such as churches, conspicuous trees, sign-posts, &c.

RAILROAD RECONNAISSANCE.

The line.—Single or double, gauge in feet and inches, description of sleepers, rails and chairs, cross-over lines, sidings, whether fit for the march of troops.

Tunnels, Cuttings, Embankments &c., nature of.

Bridges, Viaducts, &c.—Materials of which composed, dimensions, sketches.

Stations.—Size, construction, capabilities for defence, length and breadth of platform, facilities for entraining and detraining troops, open spaces in vicinity where troops can form up, camp or bivouac approaches. Indicate suitable positions for erecting additional platforms, sidings, and shunting places.

Rolling Stock.—What engines, carriages, trucks, goods, waggons, &c., are available ; carrying capacities of each.

Telegraphic apparatus.—No. of lines, batteries, &c.

Workshops and Sheds.—Size and description.

Stores.—Of fuel, water, materials for repair of rolling stock and line, &c.

Staff of Officials.—Engine drivers, pointsmen, guards, &c.

RIVER RECONNAISSANCE.

Breadth, depth, velocity, nature of banks, bed, fords, tributaries, islands, &c., liability to floods. Description of bridges, ferries, boats in general use. Command of one bank over another. Canals and locks, state if navigable. Facilities for erecting temporary bridges, with best sites for the same.

RECONNAISSANCE OF A POSITION.

The following extracts from Col. H. Schaw's book "Defence and Attack of Positions and Localities" give the various points which it is necessary to take into consideration in making a reconnaissance of a position :—

(a.) With reference to the enemy.

1. That he should not have good artillery positions, particularly opposite to the weaker or more important parts of the line, such as the flanks or the important roads traversing it.
2. Nor convenient cover to protect the advance of his infantry and to hide their movements.
3. Nor good defensive positions to resist counter-attack if that be intended.
4. Nor facilities for moving troops, especially cavalry, unseen, to operate on your communications.

Of these, the first and third are most important, if there be time for preparation, because the second and fourth can generally be arranged by a certain amount of labour.

(b.) With reference to the defender.

1. A clear field of fire, and a command of view over the front and on the flanks.
2. Good artillery positions, either opposite those which are available for the enemy, or taking them in flank and commanding the approaches.
3. Good cover for supports and reserves.
4. Extent suited to the numbers of the defenders.
5. Security for the flanks.

6. Free and covered communications throughout the position.
7. Facilities for counter attack, if it be contemplated.
8. Facilities for erecting strong points and for protecting the whole or parts of the line by obstacles according to the circumstances of the case.
9. A second position in rear to aid in recovering any part of the main position which may be lost, or to cover a retreat.
10. Suitable roads for retreat.
11. Favourable soil in the position, viz., neither hard and rocky nor soft and muddy.

General idea of a good Position.

A general line as straight as possible without pronounced salients, which must always be weak, a rampart for artillery and to cover reserves. A covered way and glacis in front for the fighting line of infantry and their supports; outworks to look into ground unseen from the main line to retard the enemy's approach, to flank the front and to facilitate counter attacks; a rallying position as a redout in rear, flanks secured.

Obstacles Covering Front.

If the battle be purely defensive, then an obstacle, such as a river in front, will be of great value, reducing the action to the defence of the defiles formed by the great roads and bridges. But if it be defensive-offensive, then such an obstacle will be disadvantageous, as it will make it too difficult for the enemy to attack

you or for you to counter-attack; but an obstacle covering a part of the position may be useful, particularly if it can be concealed until the enemy has committed himself to an attack.

DATA FOR RECONNAISSANCE.

Forage.—Contents of a rectangular stack, in tons, of hay or straw—

$$\frac{\text{Height} \times \text{Length} \times \text{Breadth in yards.}}{12 \text{ or } 17 \text{ respectively.}}$$

$$\text{Where Height} = \text{base to eaves} + \frac{\text{eaves to ridge.}}{2}$$

Contents of a circular stack—

$$\left(\frac{\text{Circ. in yds. at base.}}{12 \text{ or } 17.} \right)^2 \times \frac{\text{Height in yards}}{\text{from base to apex.}}$$

Water supply.—Allow 5 gallons per day, per man, 10 per horse.

To calculate supply from a well in gallons—

$$4.9 (\text{diameter of well in feet})^2 \times (\text{depth of water in feet}) = \text{Supply.}$$

If a well is liable to run dry, the time it takes to regain a given level should be noted.

To calculate supply from a small stream, form a weir across it with planks or earth, etc., and receive the water flowing over in a vessel of known capacity, noting the time carefully that it takes to fill. Then discharge per minute in gallons.

$$= \frac{\text{Content of vessel in inches}}{\text{Time of filling in seconds}} \times .22$$

N.B.—A gallon of water weighs 10 lbs., and one cubic foot of water equals $6\frac{1}{4}$ gallons.

Accommodation may be calculated as follows :—

In rooms 15 ft. wide, allow 1 man per yard run, 15 to 25 ft. wide, 2 men per yard, over 25 ft. wide, 3 men per yard. Another method is to measure the front of a house, or line of houses, and for those 1 room deep, allow 1 man per yard of front, for those 2 rooms deep, 2 men per yard, and multiply in both cases by number of stories.

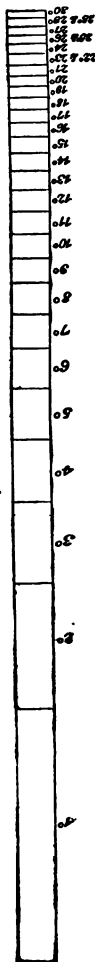
For horses allow, in sheds 15 ft. wide, 1 per 2 yards of length ; sheds 24 ft. wide, 2 per 2 yards of length.

Bivouacs, sizes of:—

A battalion	...	...	2 acres.
A regiment of cavalry	...	...	3 to 5 acres.
A battery	...	...	2 acres.
Every 16 vehicles	...	...	2 acres.

N.B. An acre is 70 square yards of ground.

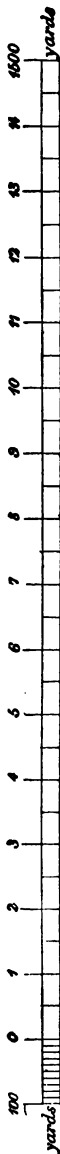
Scale of Slopes:



Scale 4"-1 Mile. R.F. $\frac{1}{15,840}$



Scale 6"-1 Mile. R.F. $\frac{1}{13,200}$



HINTS ON EYE SKETCHING.

Place the drawing board on any flat raised surface, such as the top of a wall, post, etc.; if such are not available, then lay it on the ground. Select a base as long as possible, align the ruler on the distant object stand back a pace or two, then hold up the pencil vertically and see if the edge of the ruler appears to correspond with it, if it does not, move the board about until it does; then draw a line along the edge. In the same manner, the ruler being moved now and the board kept steady, take rays to distant points which it is desired to fix. This done pace to the other end of the base and mark the distance off along the line on the paper which represents the base. Again set the board by aligning the ruler back along the base, fix the stations already selected by again taking rays to them. Traversing is conducted by aligning the ruler always on the back angle. After a few important stations have been fixed by intersection, resection can be resorted to for fixing other stations and plotting minor detail. The best method of doing this is to place a sheet of tracing paper on the board; select three distant stations already fixed on the paper, they should be as wide apart as possible, draw rays to them from any point on the tracing paper; apply the tracing paper to the sketch and move it about till the lines on it pass each through its corresponding station on the sketch. Prick a hole through the point of intersection of the lines on the tracing paper, this will mark the position of the observer on the sketch.

If the sun is shining, one may sometimes sketch detail by its help; before leaving a station "set" the board by the known points, stick the pin firmly in it and draw a pencil line along the shadow. Then the board may subsequently be re-set so that the shadow falls again on the line. This will be only approximately true for a quarter-of-an-hour or so after it is first drawn.

An approximately true north point may be found by placing a watch on the paper with the hour hand directed towards the sun, then an imaginary line, drawn from the centre of the dial bisecting the lesser angle between the hour hand and the figure XII, will be the direction of the meridian or south in the northern hemisphere correct within about 20° .

To be a good judge of distance is of great use in making sketches. The following is a method in use in the German army, and very fairly accurate results are obtained by it:—

Raise the arm to its full extent and straight in front of the body, thumb pointing upwards, close the left eye and align the tip of the thumb on the object with the right eye, now close the right eye and look over tip of thumb with the left eye, it will appear as if the thumb had moved to the right; take note of the distant object over which the thumb now points and estimating the distance between the two objects multiply by 10, the result will be the distance of the original object from point of observation.

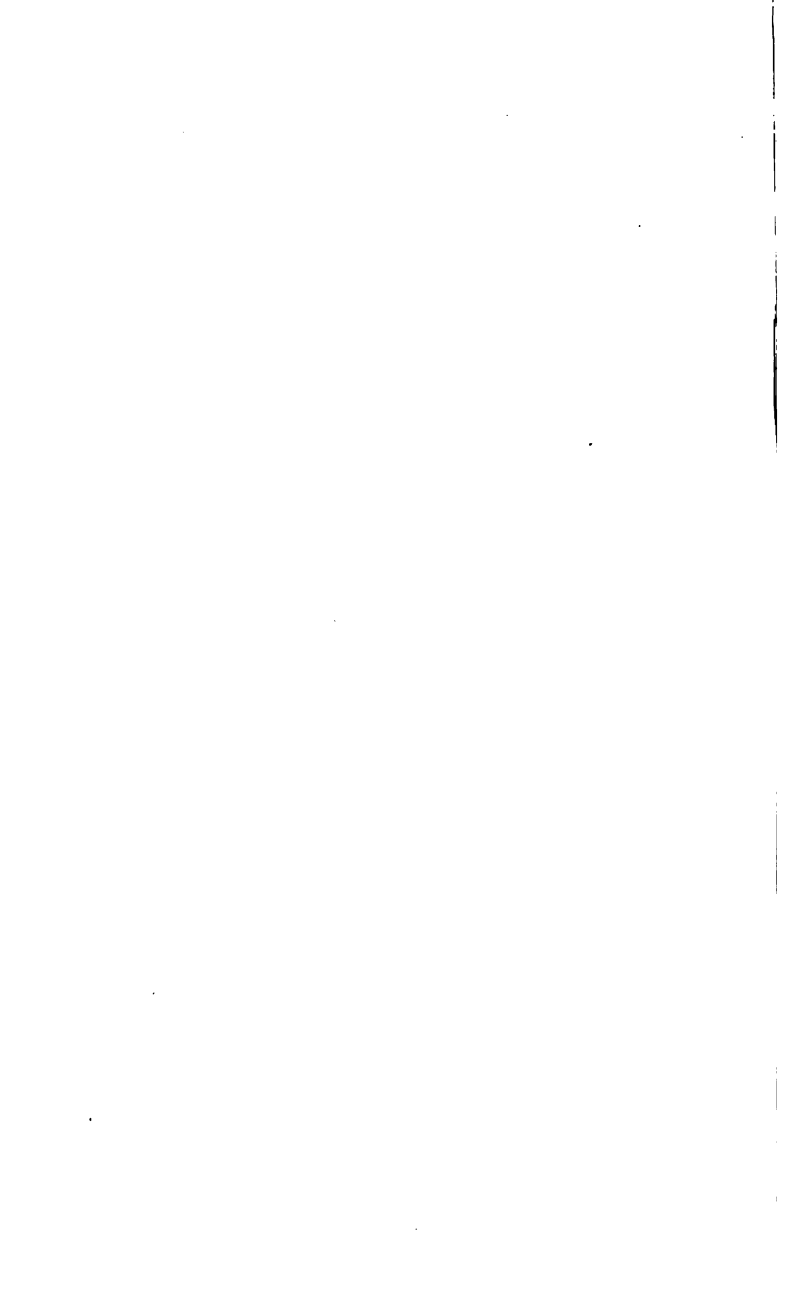
The above method is based on the fact that, as a rule, in the generality of men, the distance between the pupils of the two eyes is one-tenth of the distance between the right eye and the thumb when the arm is stretched out at a level with the eye and in front of the body. Mathematically, the proof of the correctness of the above method lies in the principle that in similar triangles the sides are proportional. The Germans consider that it is easier to become a good judge of 50 to 150 yards transversely, at a distance than of 500 to 1500 yards longitudinally.

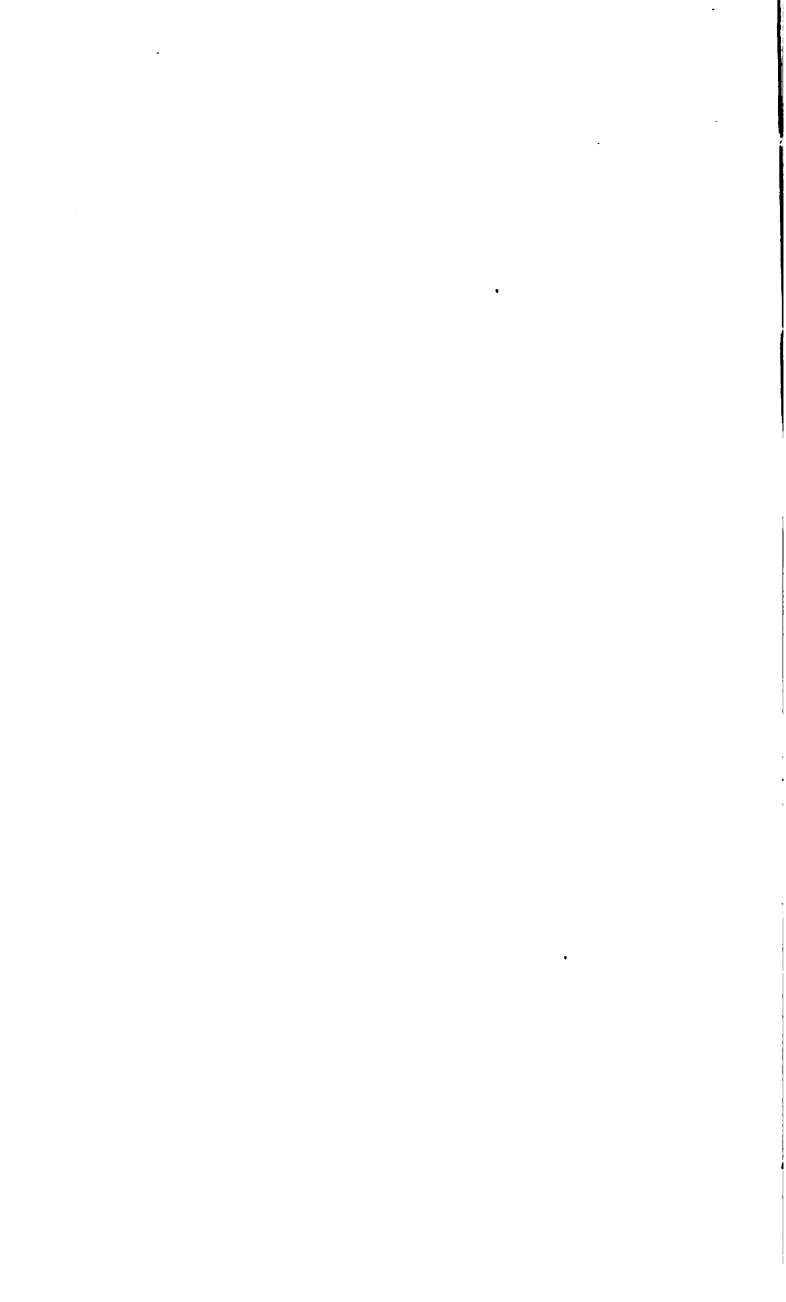
MILITARY ENGINEERING.

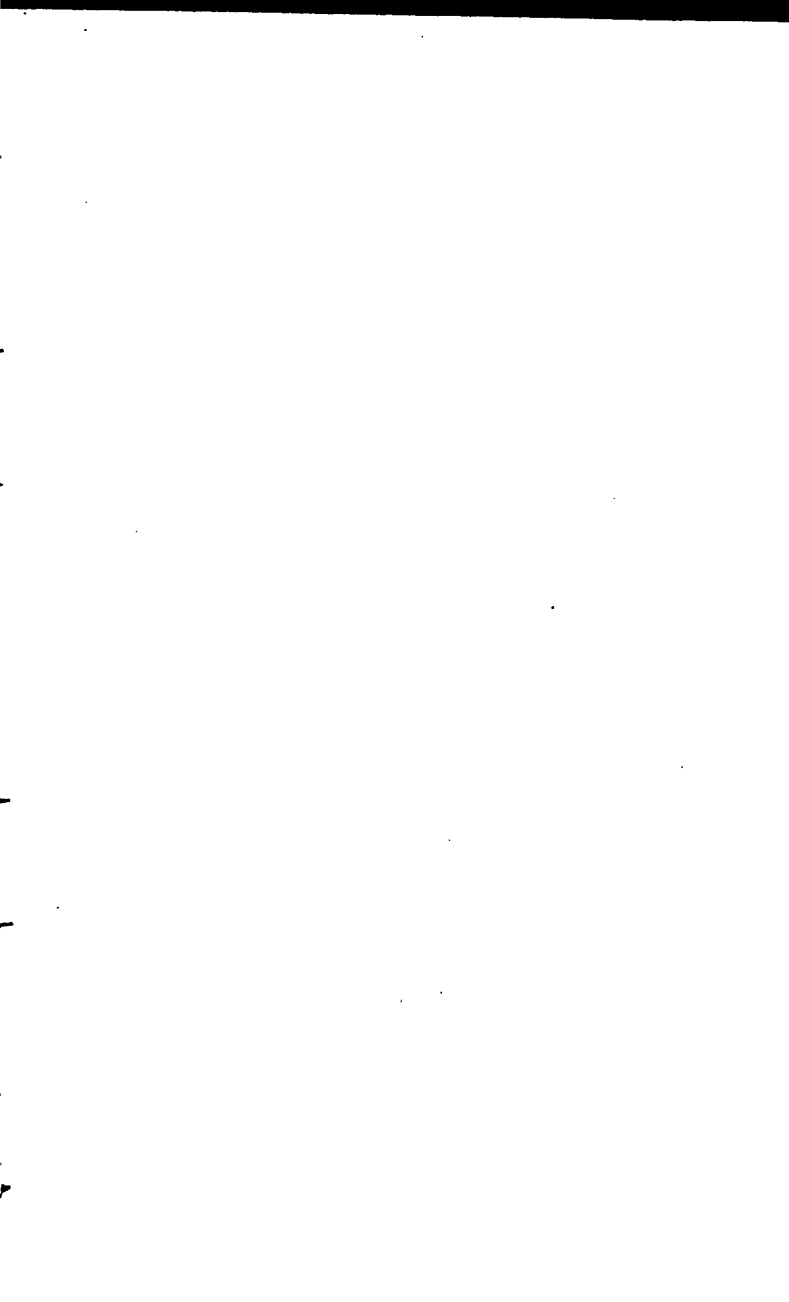
DESCRIPTION.	No. of Working Party.	Principal Tools, proportion to Party	Remarks.
IN 1 RELIEF.			
Clearing Hedges, 2" stems ...	1 man	Axes $\frac{1}{2}$, Bill Hooks 1	Parties of 25; cut only.
" " Brushwood, thick ...	to 30 paces	" $\frac{1}{2}$ Bills 1	Parties of 12.
Levelling Walls ...	120s. paces	Ram with tree or rail	Time is as cube of diam.
Felling Trees, 9" hard wood ...	3 paces	Axes 1 or C.O., Saw $\frac{1}{2}$	
" " soft ...	10	" 1 " "	
Shelter Trench, 5 ft. ...	20	Picks 1, Shovels 1	
" " 5 ft. improved ...	5 paces	" 1 " "	For quickest rate.
4 $\frac{1}{2}$ Breastwork, unrevetted ...	3	" 1 " "	2 paces apart.
Gun Pit or Epaniment ...	1	" 1 " "	2 rows Diggers.
Limber Pit ...	$\frac{1}{2}$	" 1 " "	
Stockade, round timbers ...	$\frac{1}{2}$	" 1 " "	
Splinter proof against wall, &c. ...	$\frac{1}{2}$ pace	Pick $\frac{1}{2}$, Shovel $\frac{1}{2}$, Saw $\frac{1}{2}$	Parties of 2 R.E., 8 Infantry in addition to R.E.
Wire Entanglement low, belt 10 yds. wide ...	$\frac{1}{2}$	Picks $\frac{1}{2}$, Shovel $\frac{1}{2}$	Parties of 5.
" " high, 5 yds. wide ...	$\frac{1}{2}$	Bills $\frac{1}{2}$, &c.	" 5.
Brushwood or Tree Entanglement 10 yds. wide ...	8 paces	" $\frac{1}{2}$ Bills $\frac{1}{2}$, Saws $\frac{1}{2}$	
Military Pits, 5 rows ...	2	Pick 1, Shovel 1, Bills $\frac{1}{2}$	
Abatis, careful, 10 yds. wide ...	2	Axes $\frac{1}{2}$, Bills $\frac{1}{2}$, Saws $\frac{1}{2}$	
Walls, notched ...	1 $\frac{1}{2}$	Picks 1	
" " loopholed ...	24	" 1, Crowbars $\frac{1}{2}$	Banquette, &c. must be reckoned extra.
Hedge, prepared for defence ...	12	" 1, Shovels 1, Bills $\frac{1}{2}$	
IN 2 RELIEFS.			
+4 $\frac{1}{2}$ Parapet to resist Artillery, 44 sq. ft.	1 R., 1 pace	Picks 1, Shovels 1	2 rows Diggers.
" " " " 65 "	2 R., 2 "	" 1 " "	2 " "
" " " " " "	1 R., 1 "	" $\frac{1}{2}$ " "	2 " " Shovel.
" " " " " "	2 R., 2 "	" 1 " "	2 " " Shovel.
Field casemates, rough	{ including 1 R. preparing 2 R. timber 3 R. }	Picks $\frac{1}{2}$, Shovels $\frac{1}{2}$	In each Relief.

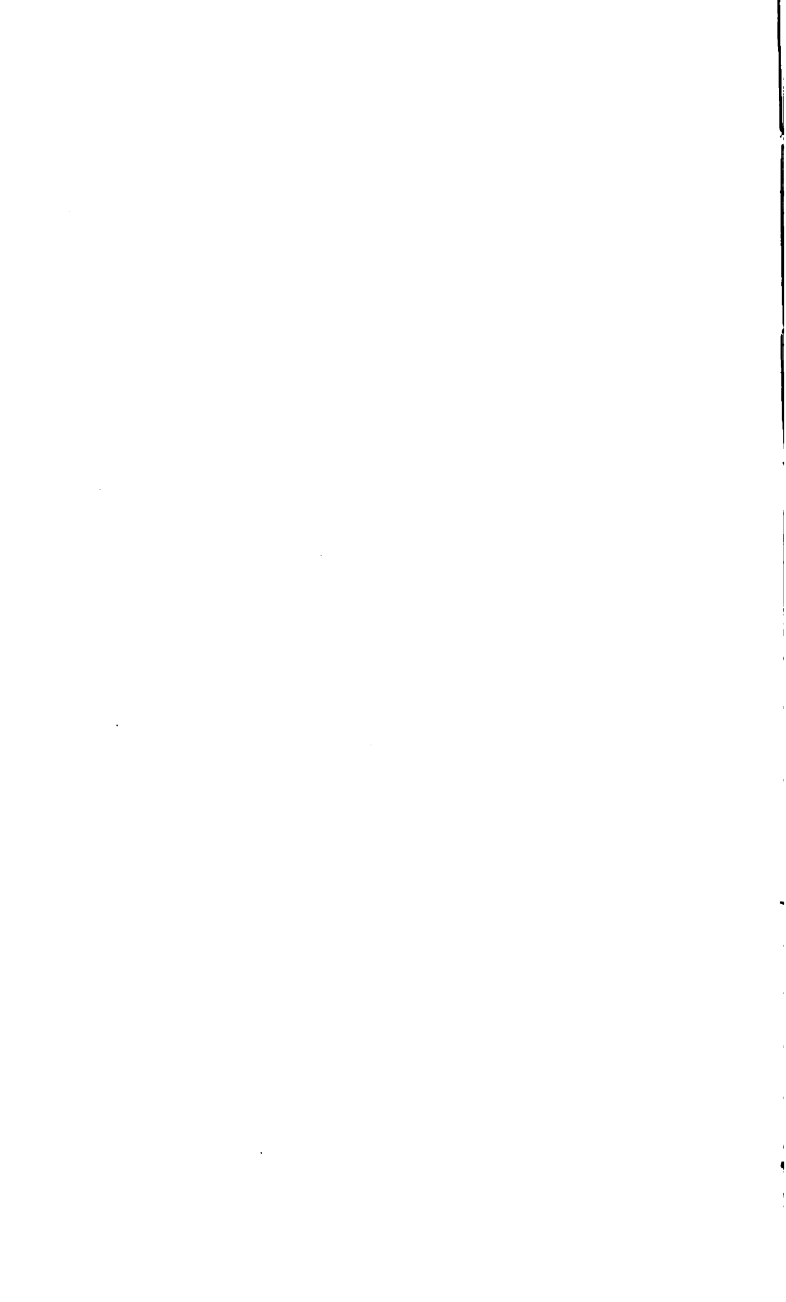
N.B.—The above Table supplied at the S.M.E., Chatham, enables a calculation to be formed of the strength of Working Party, and number of Tools required for any extent of Work

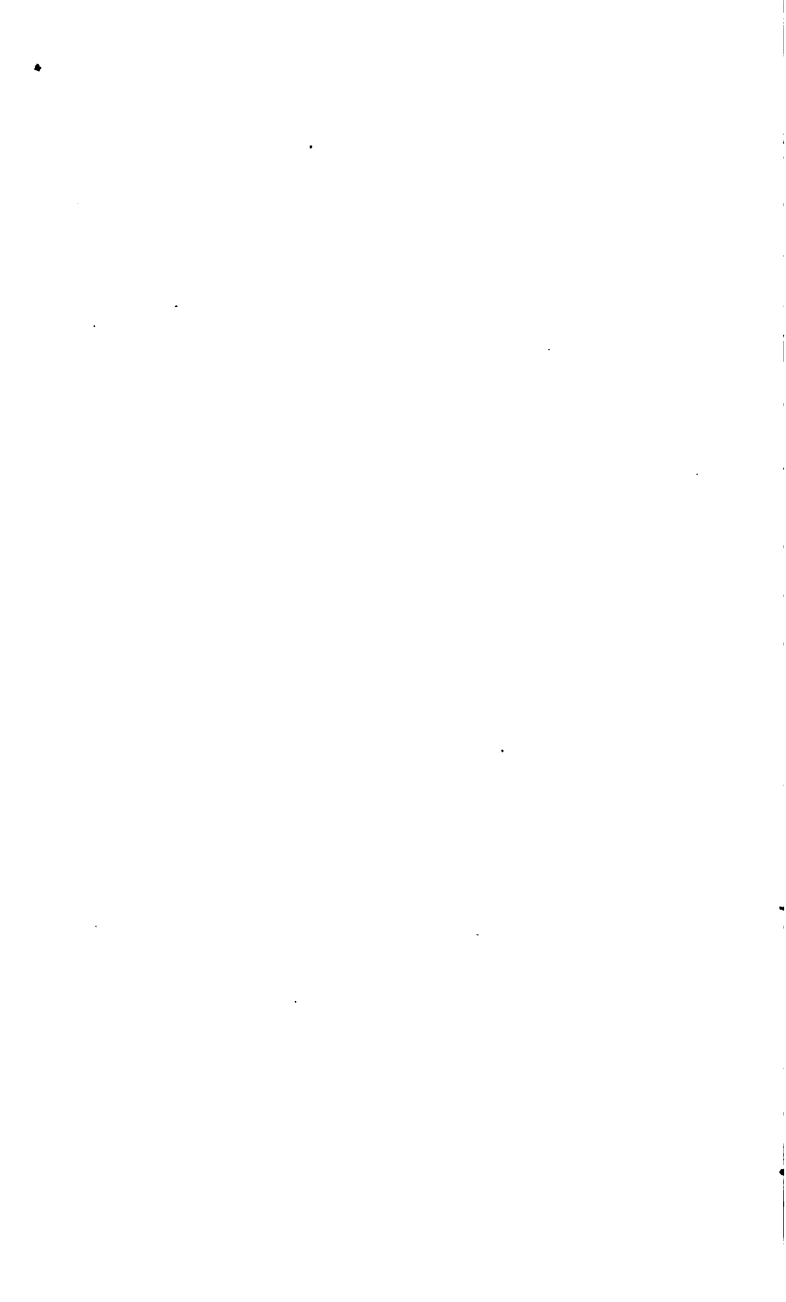


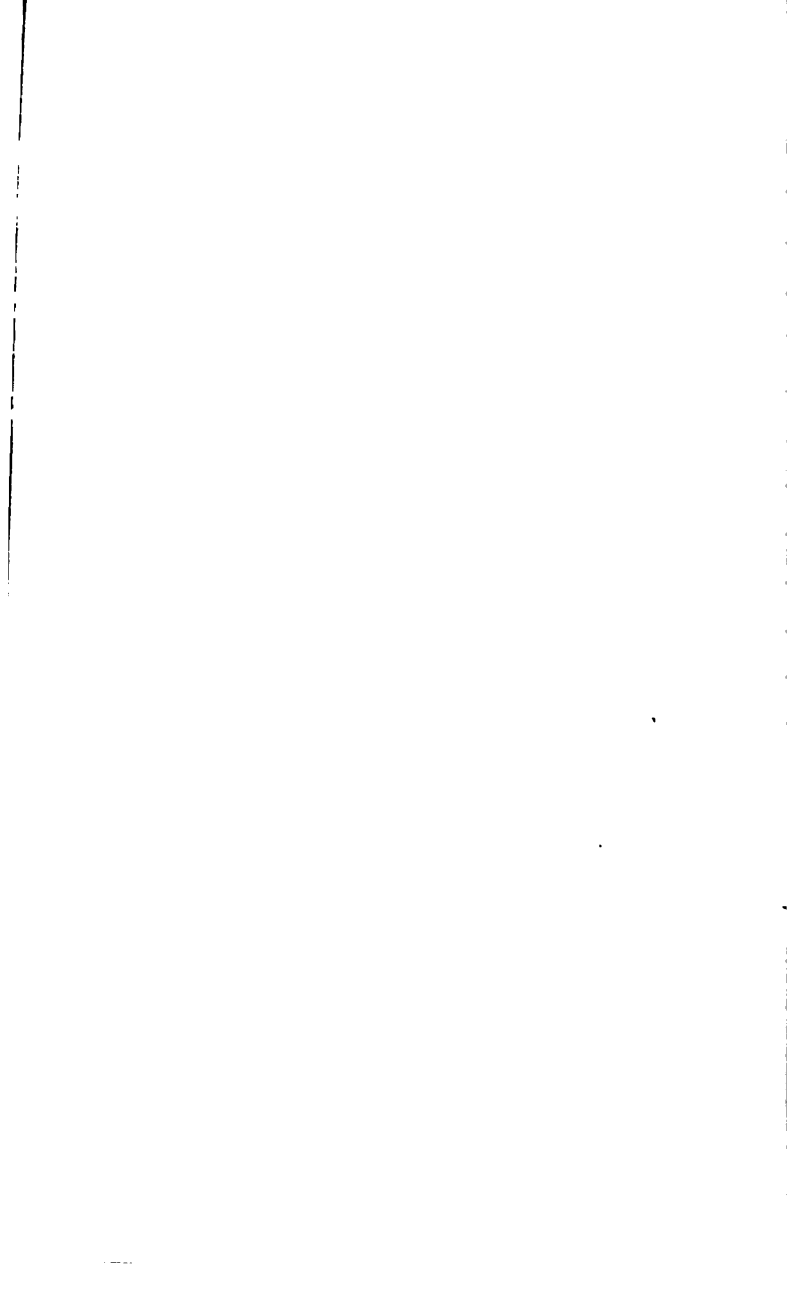


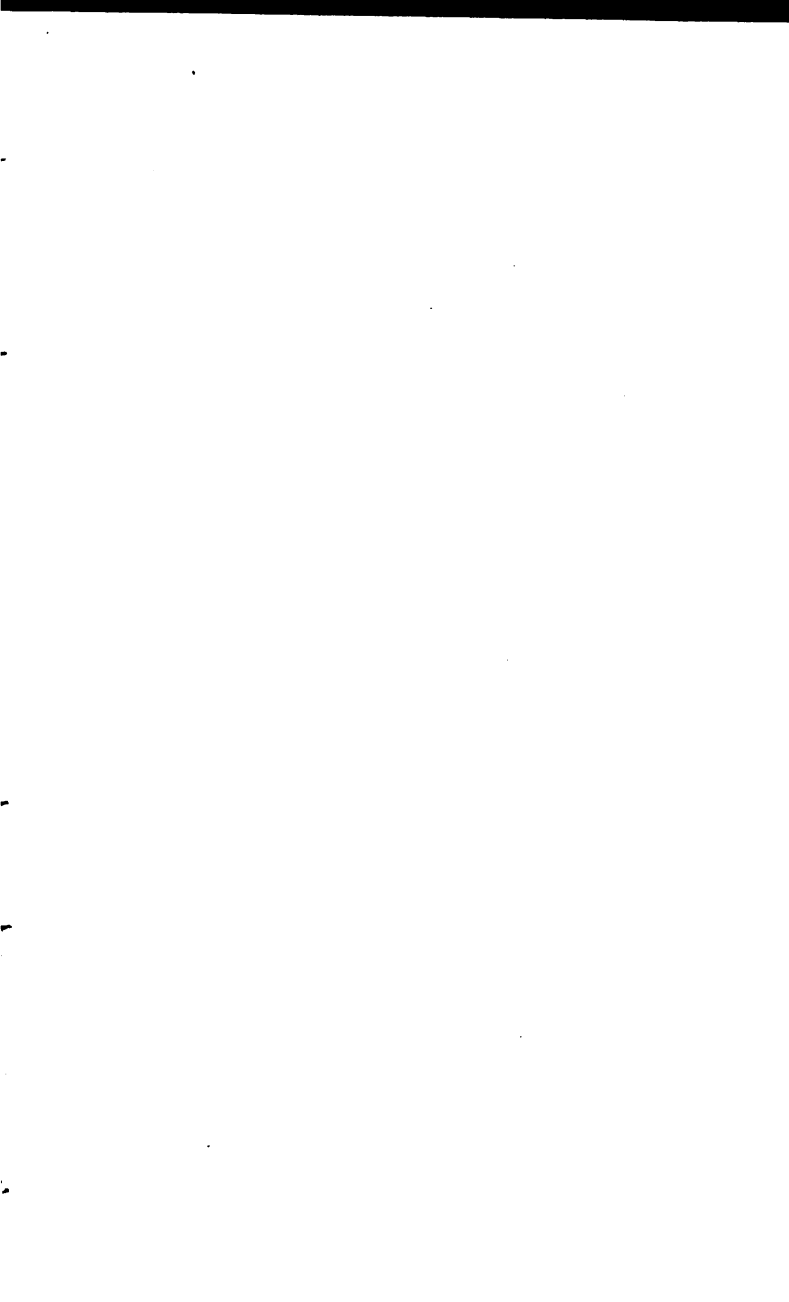


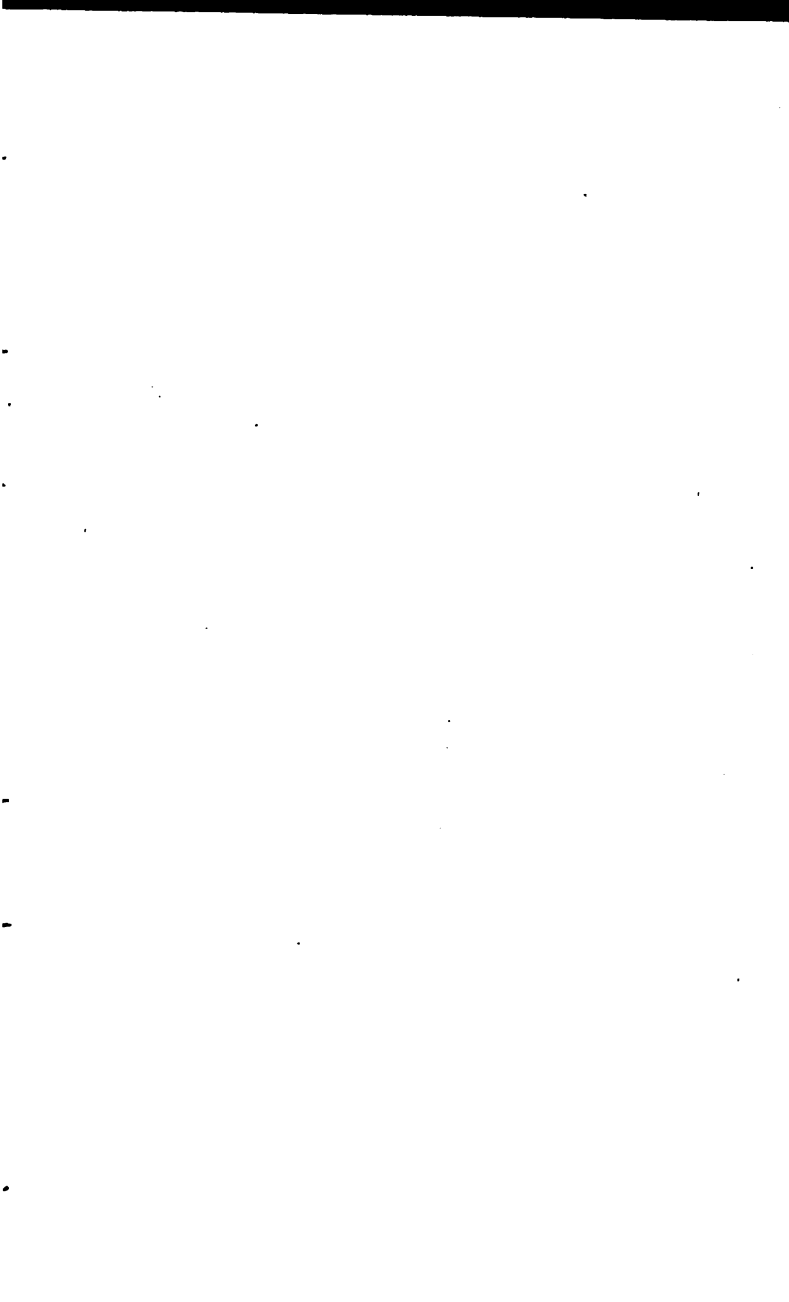


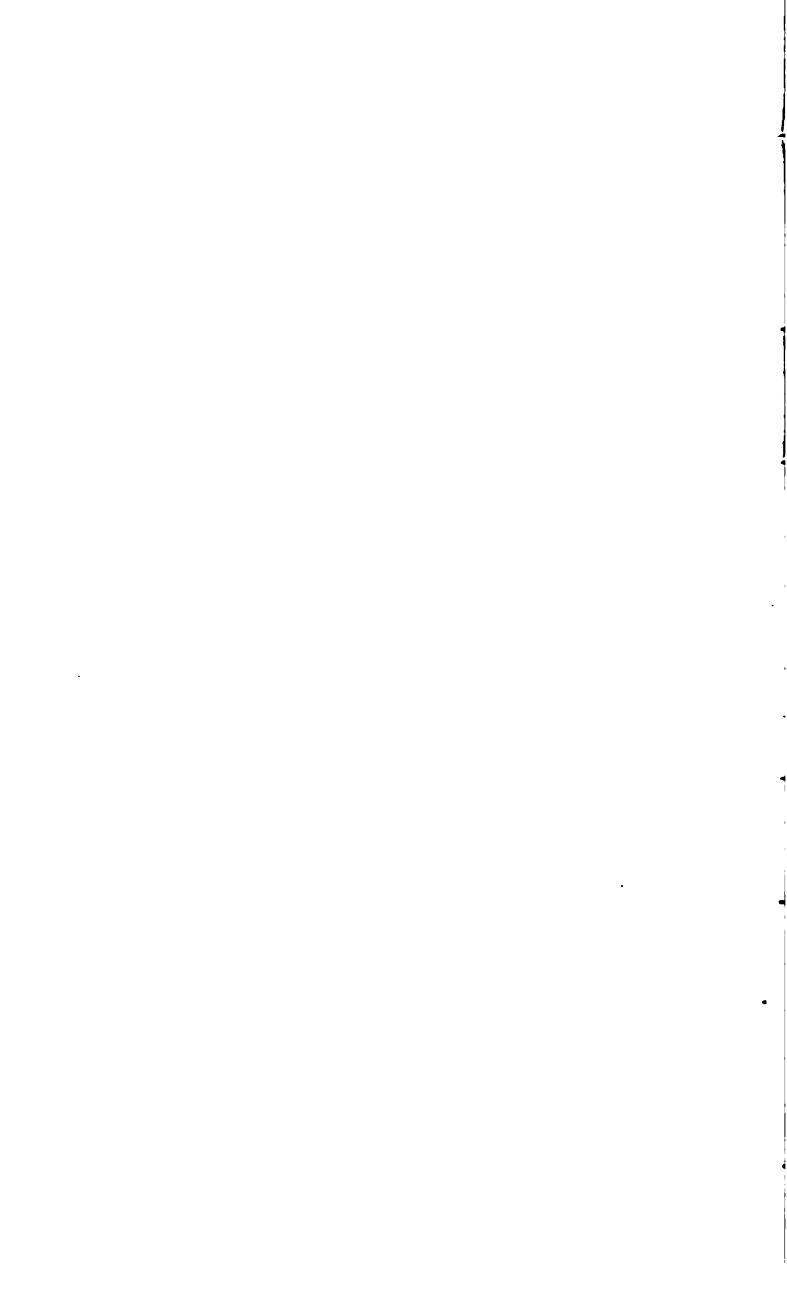


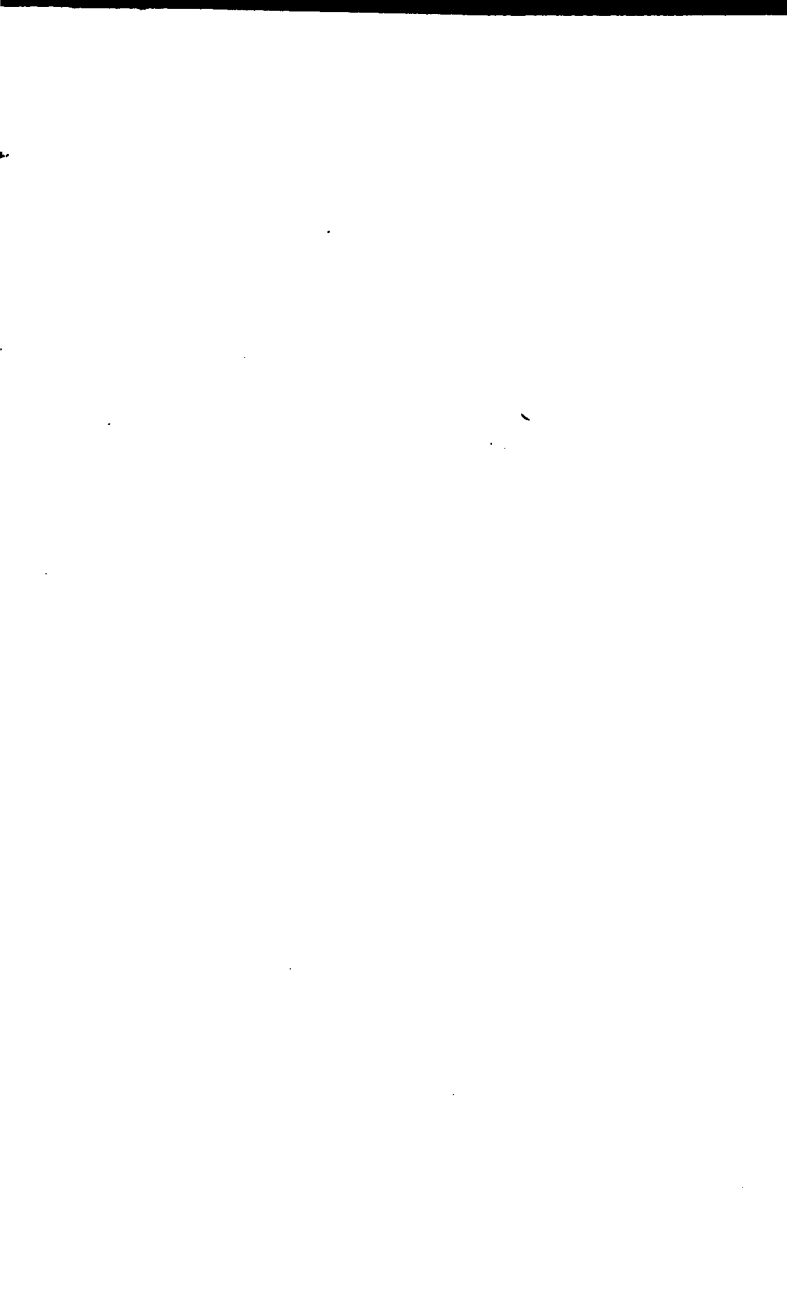




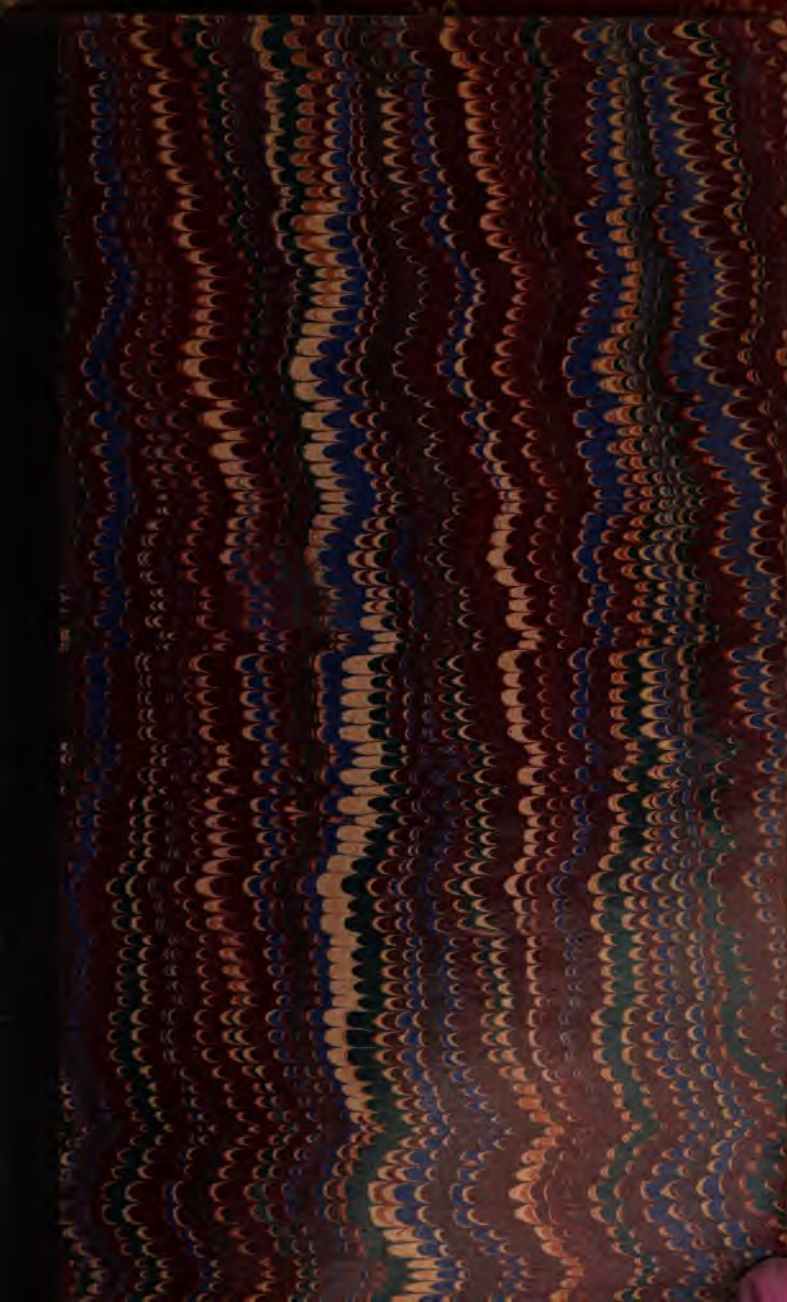


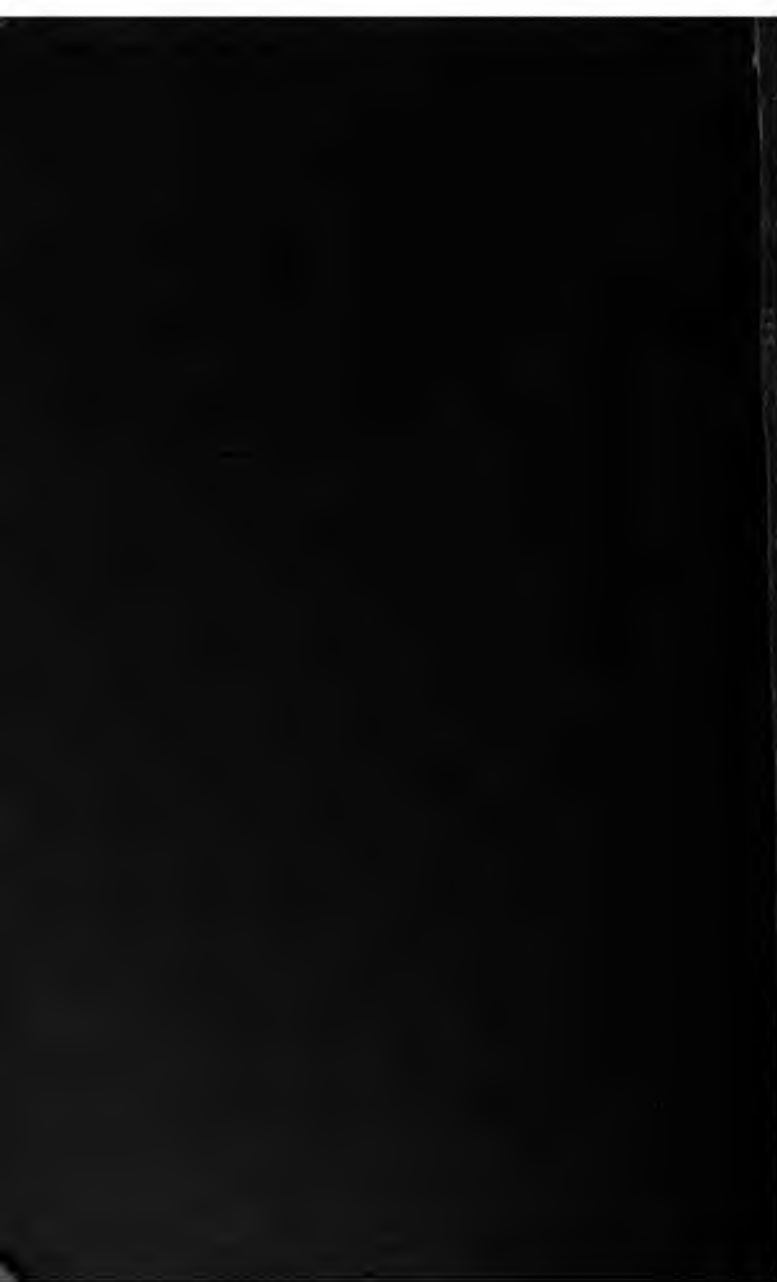






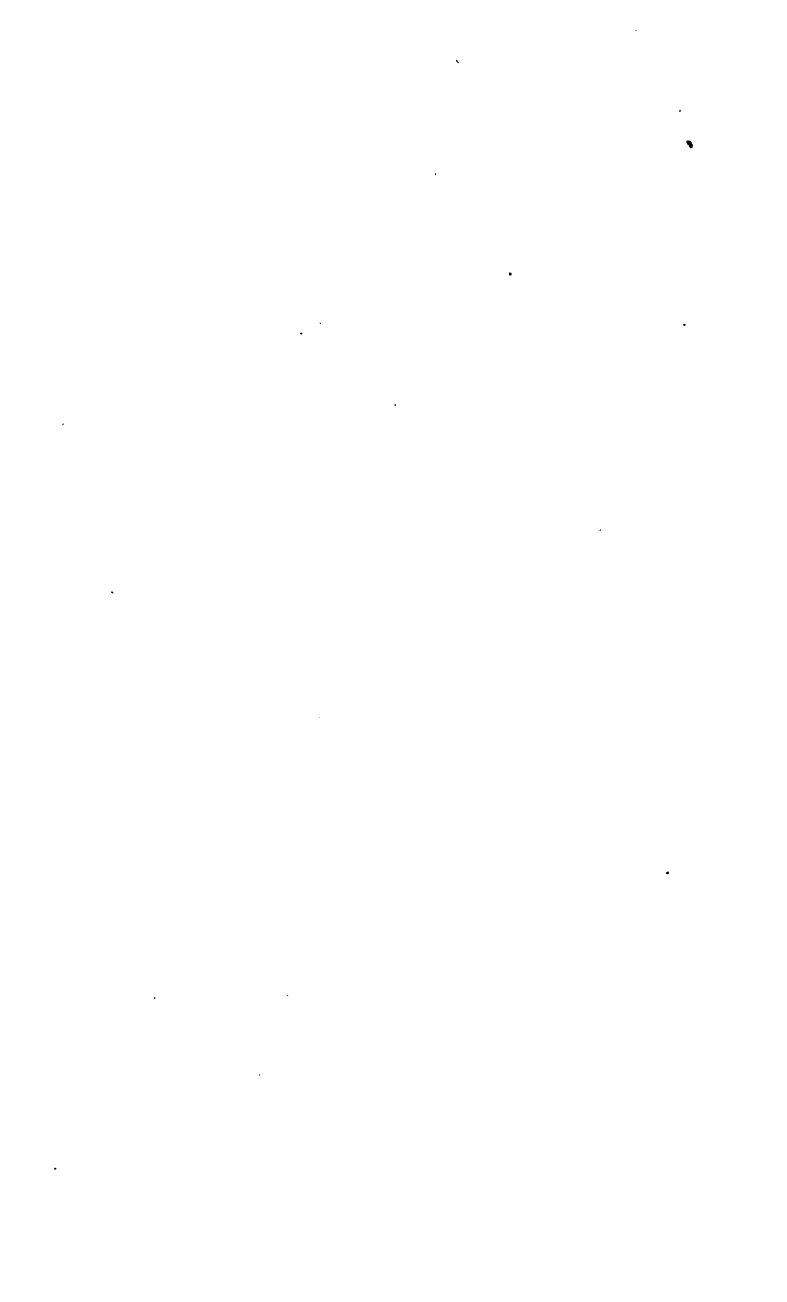






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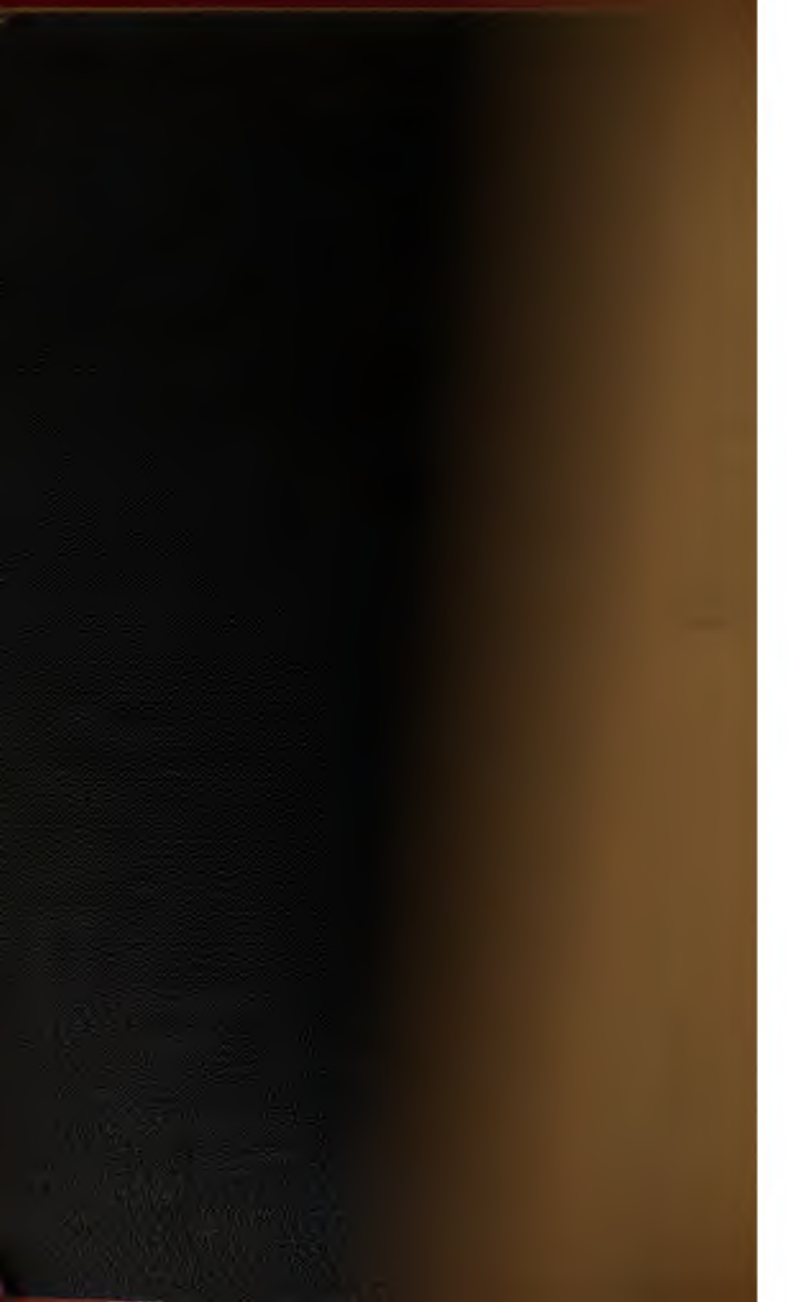
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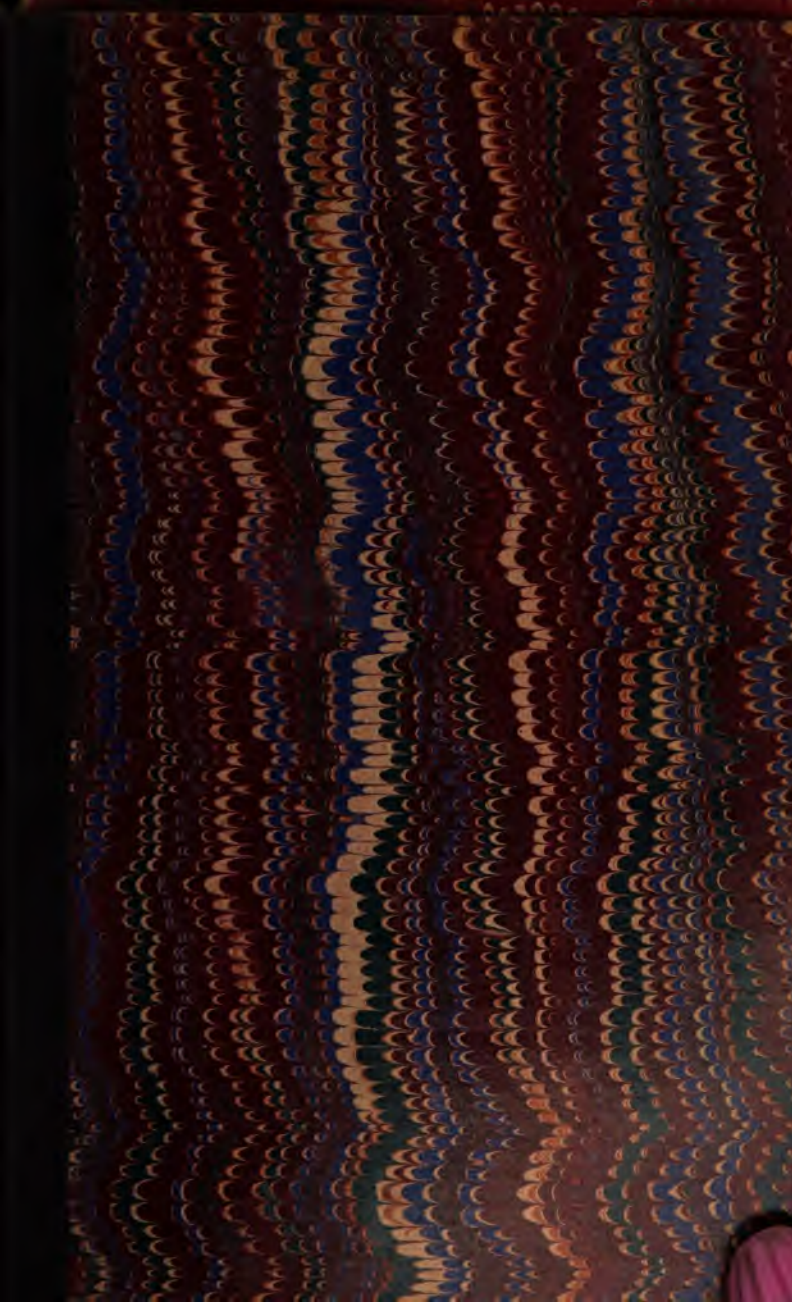
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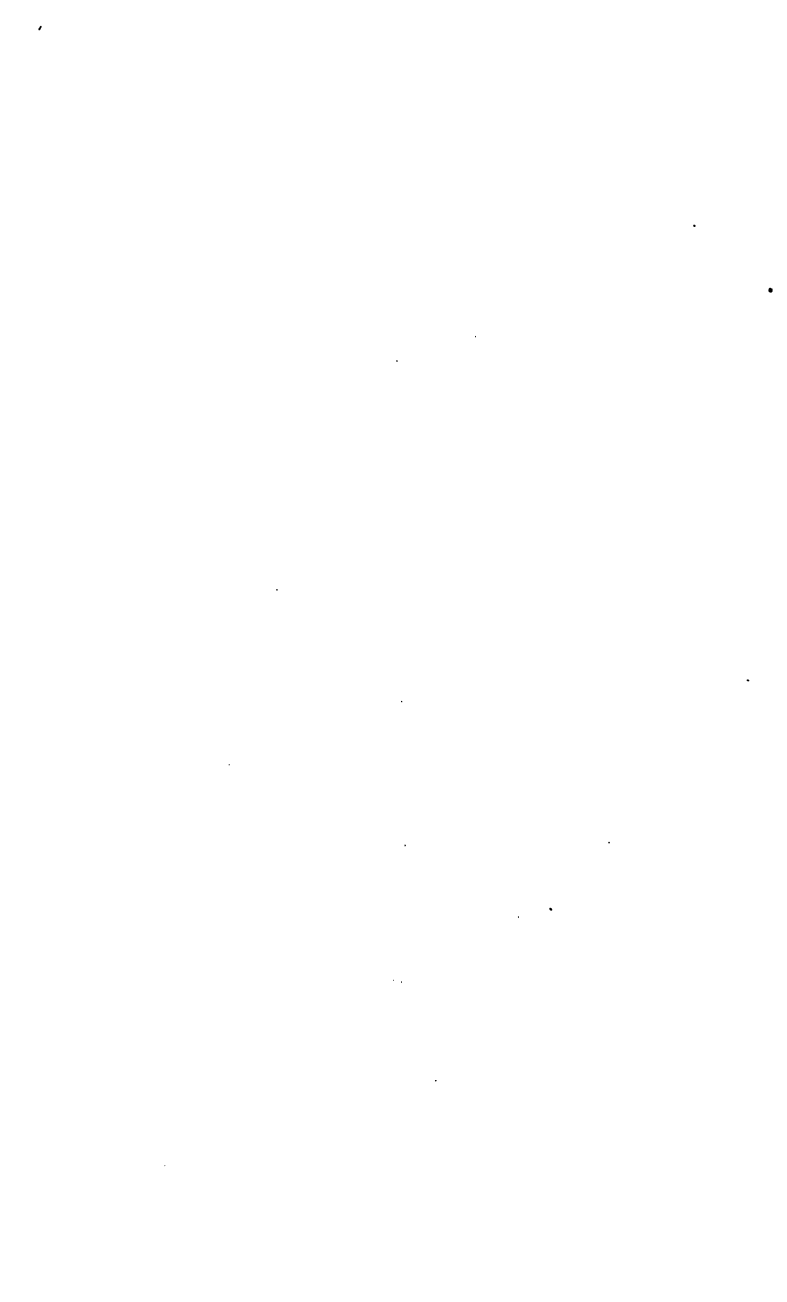


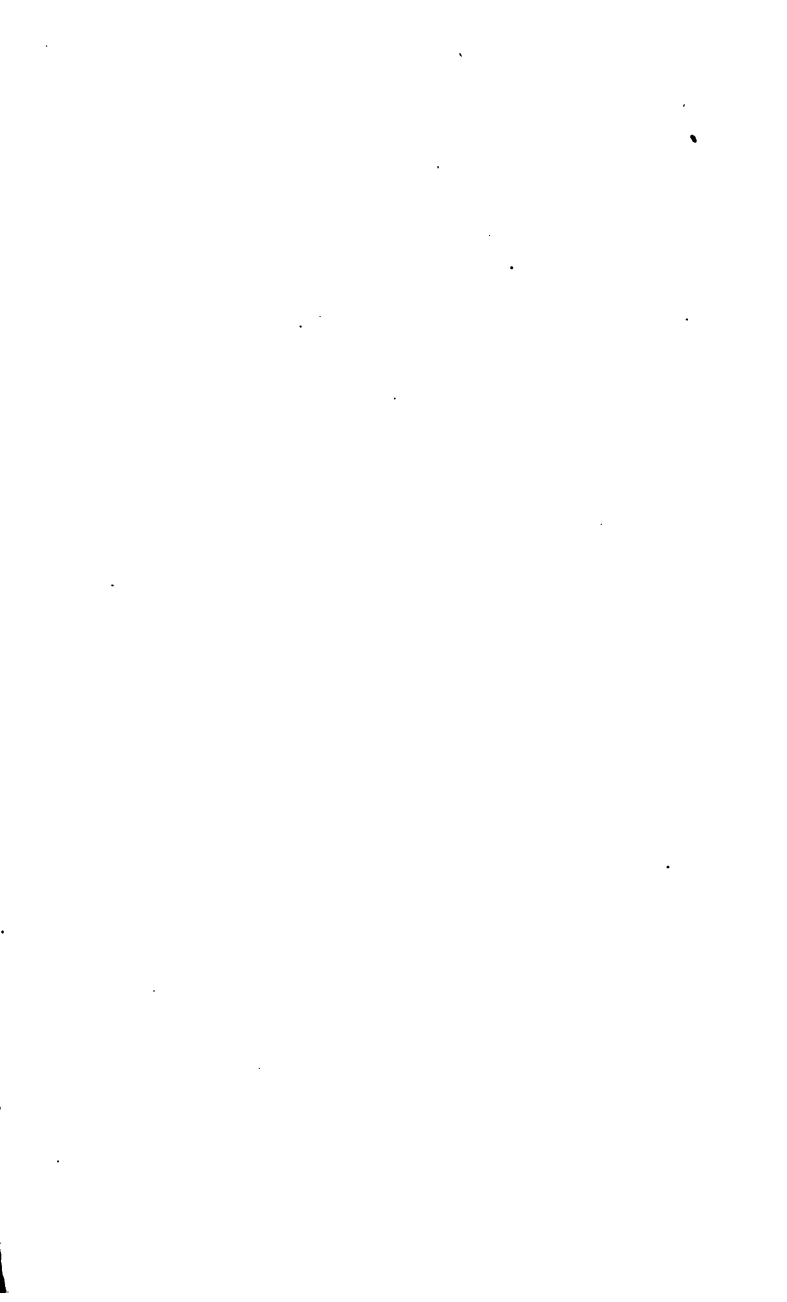




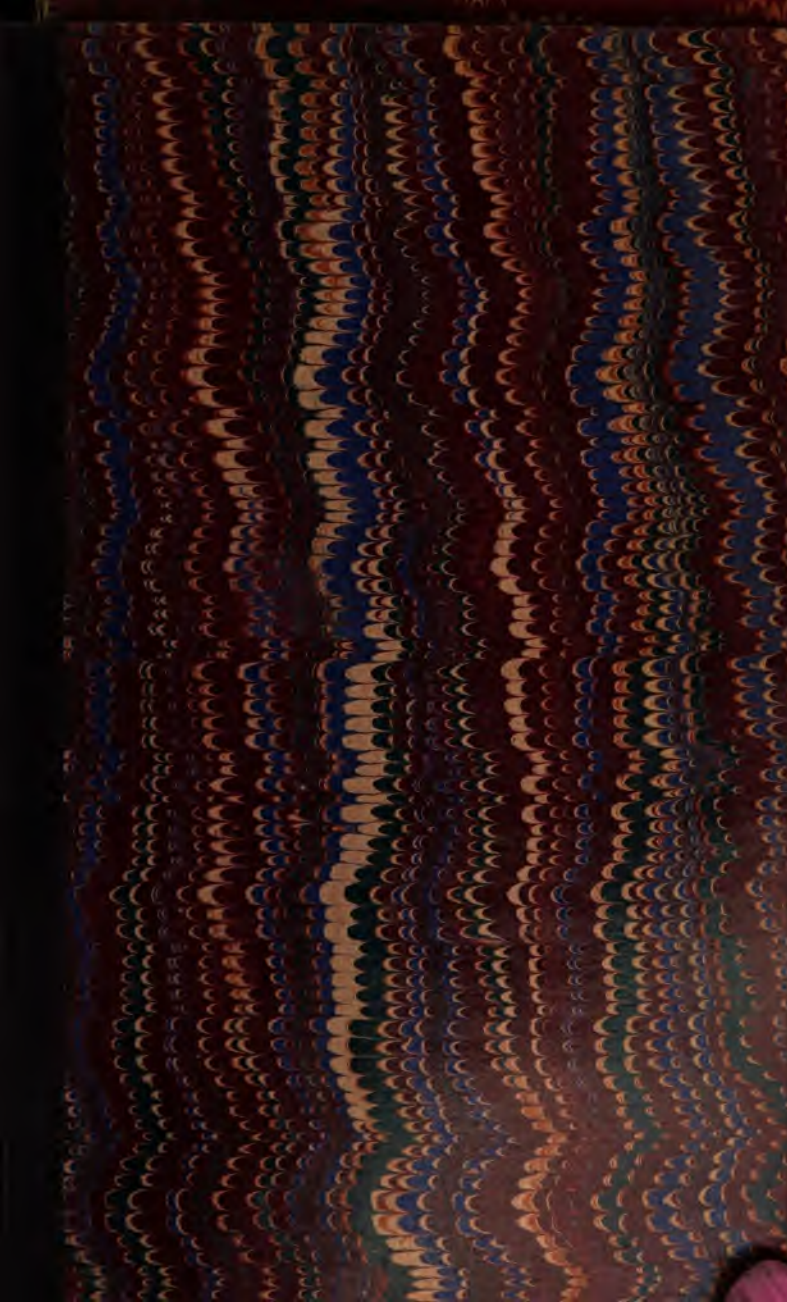
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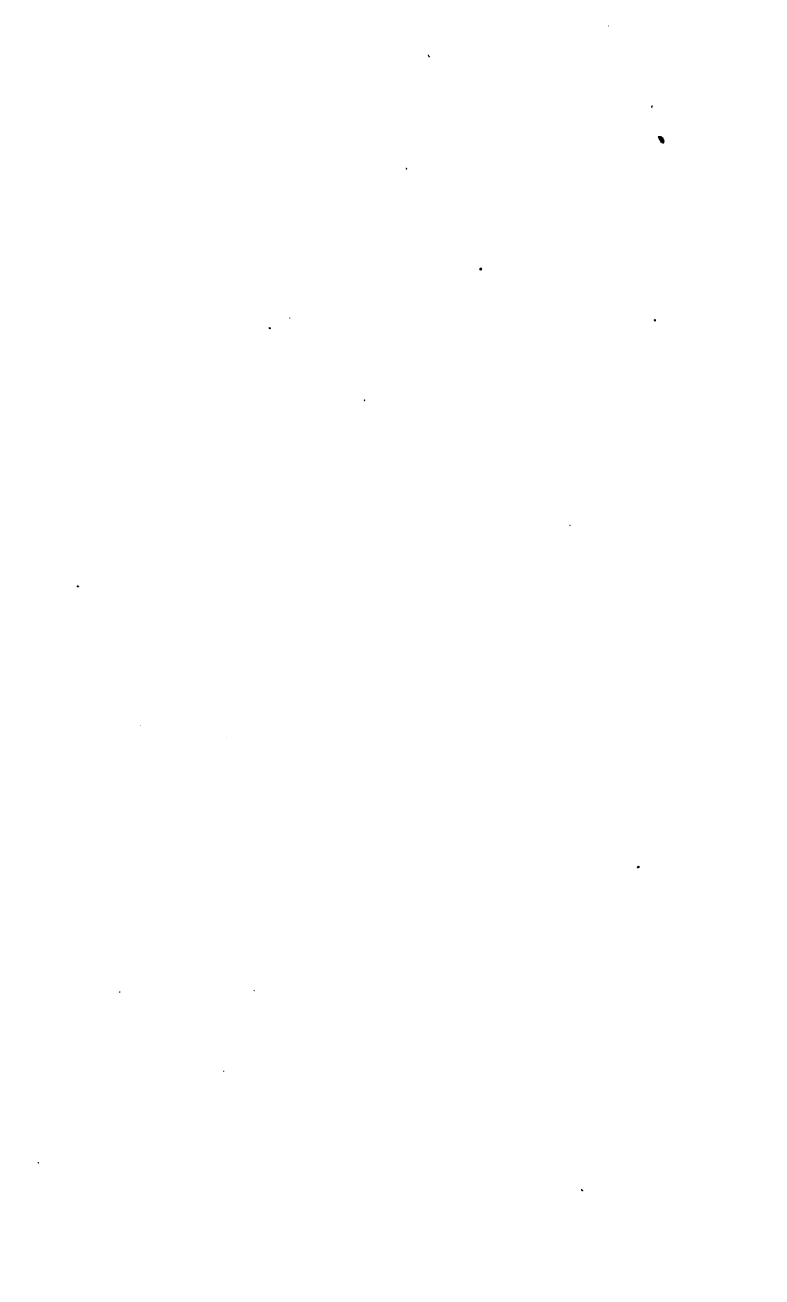






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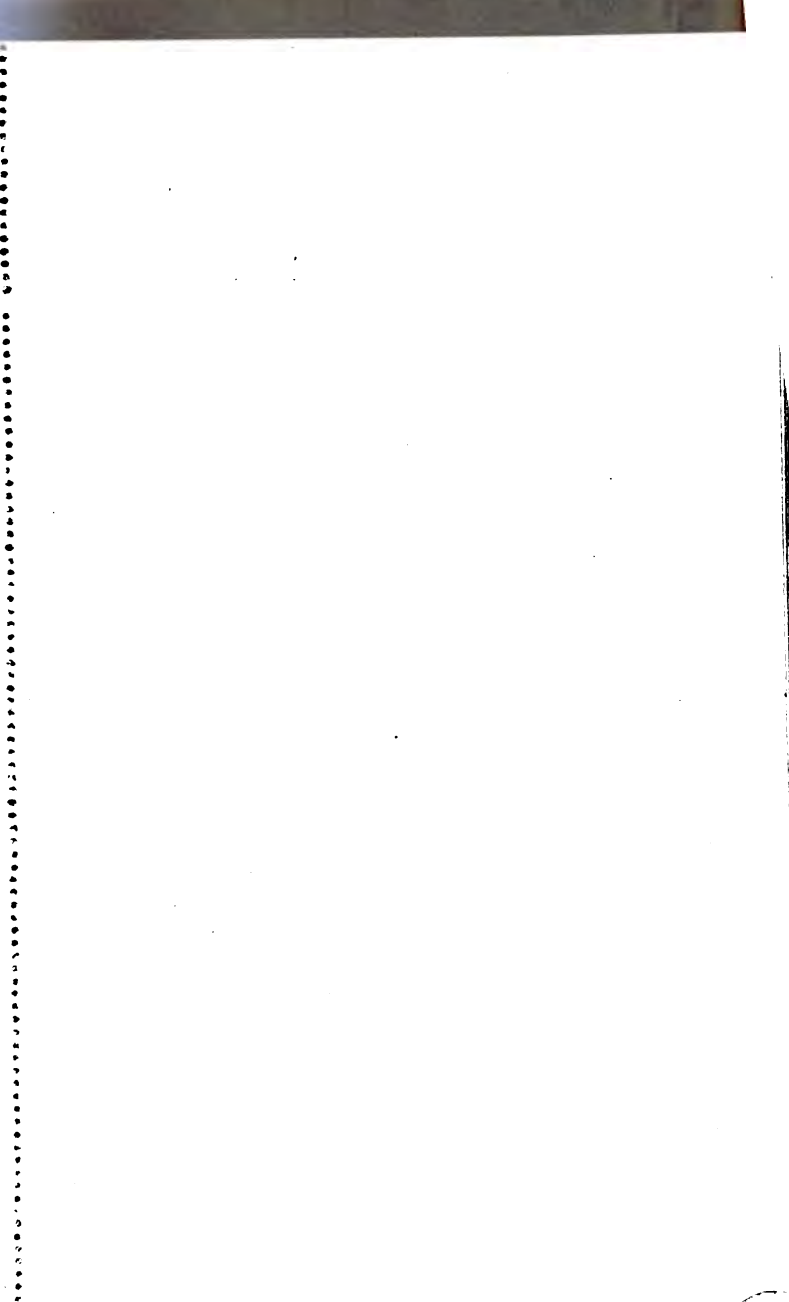
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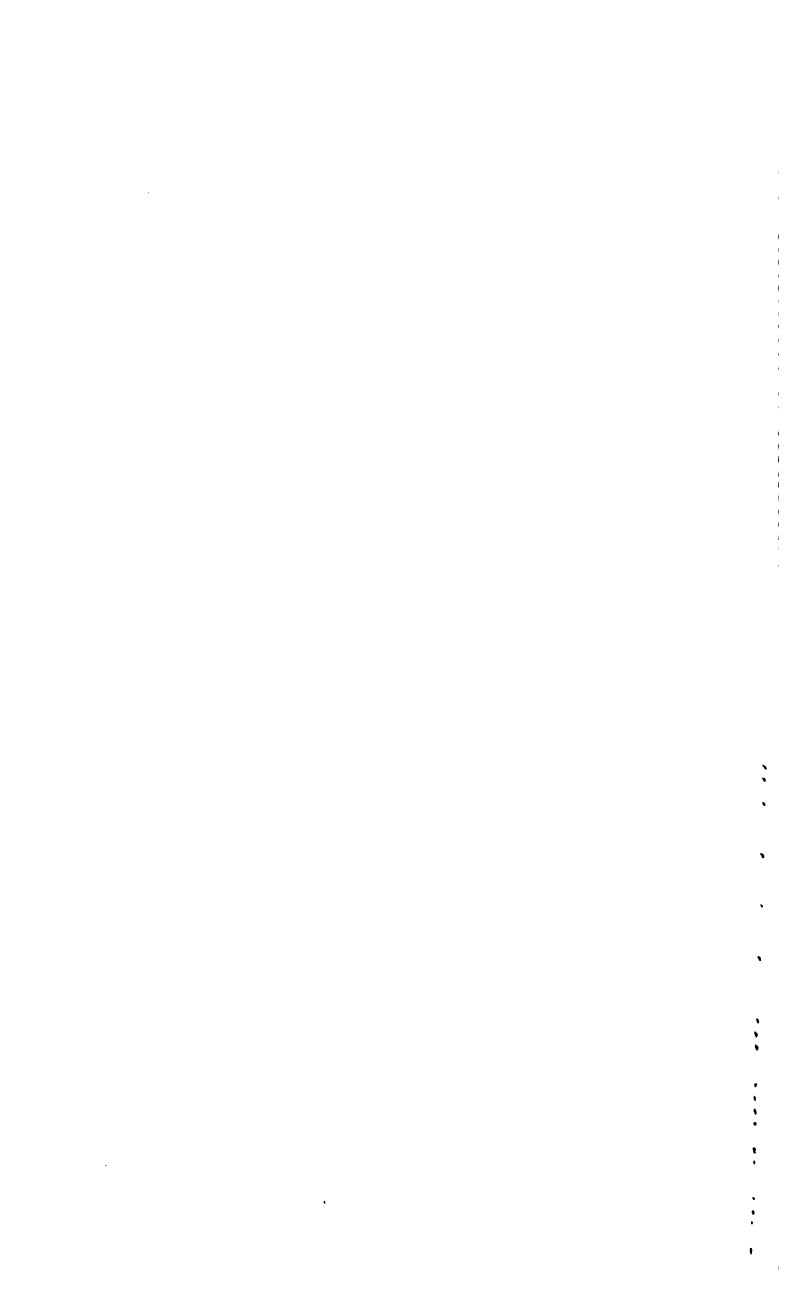
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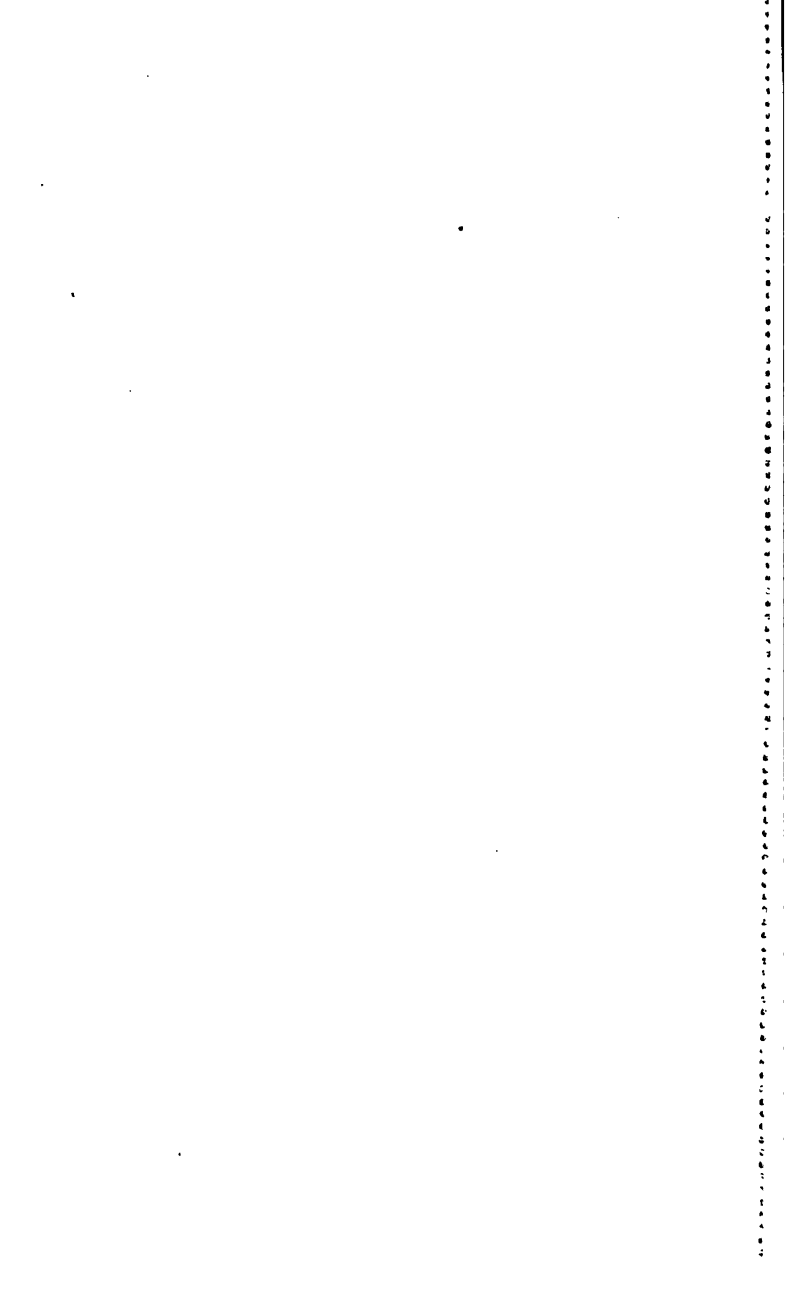
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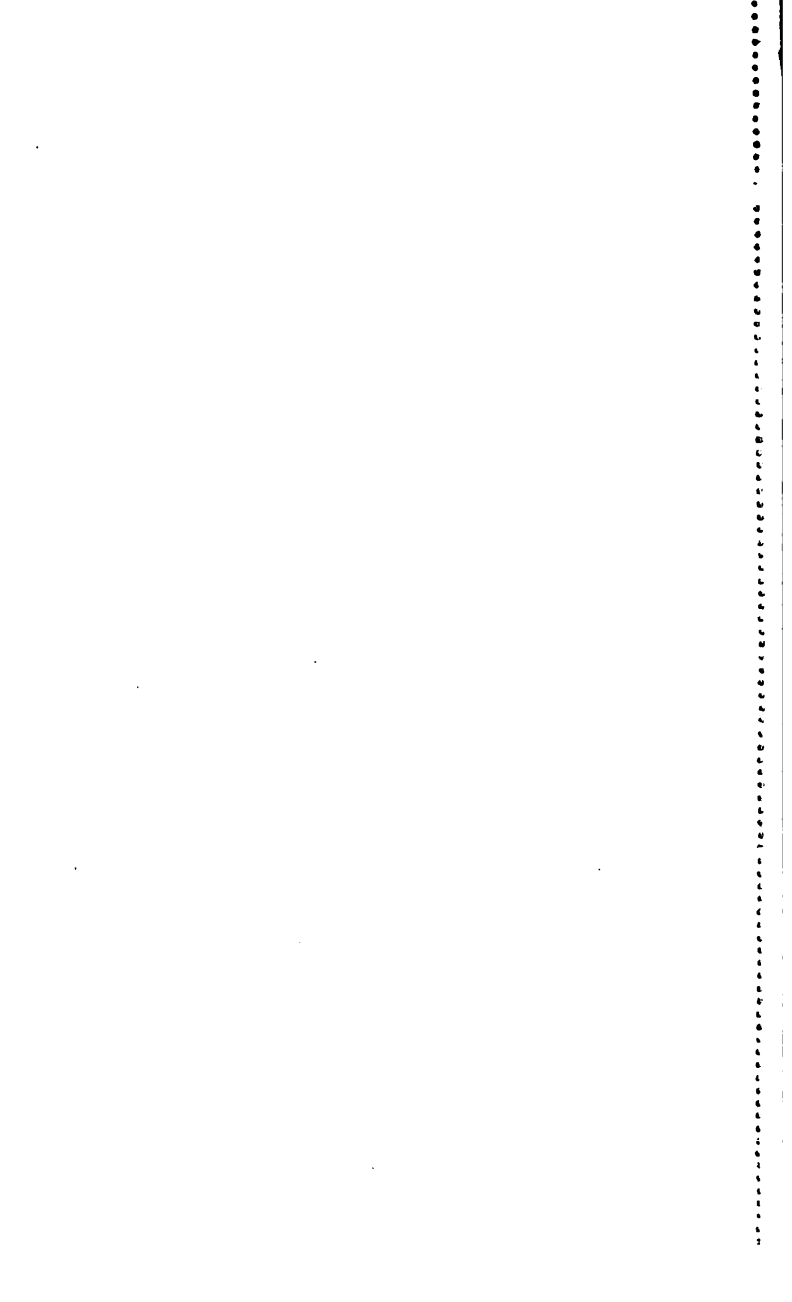
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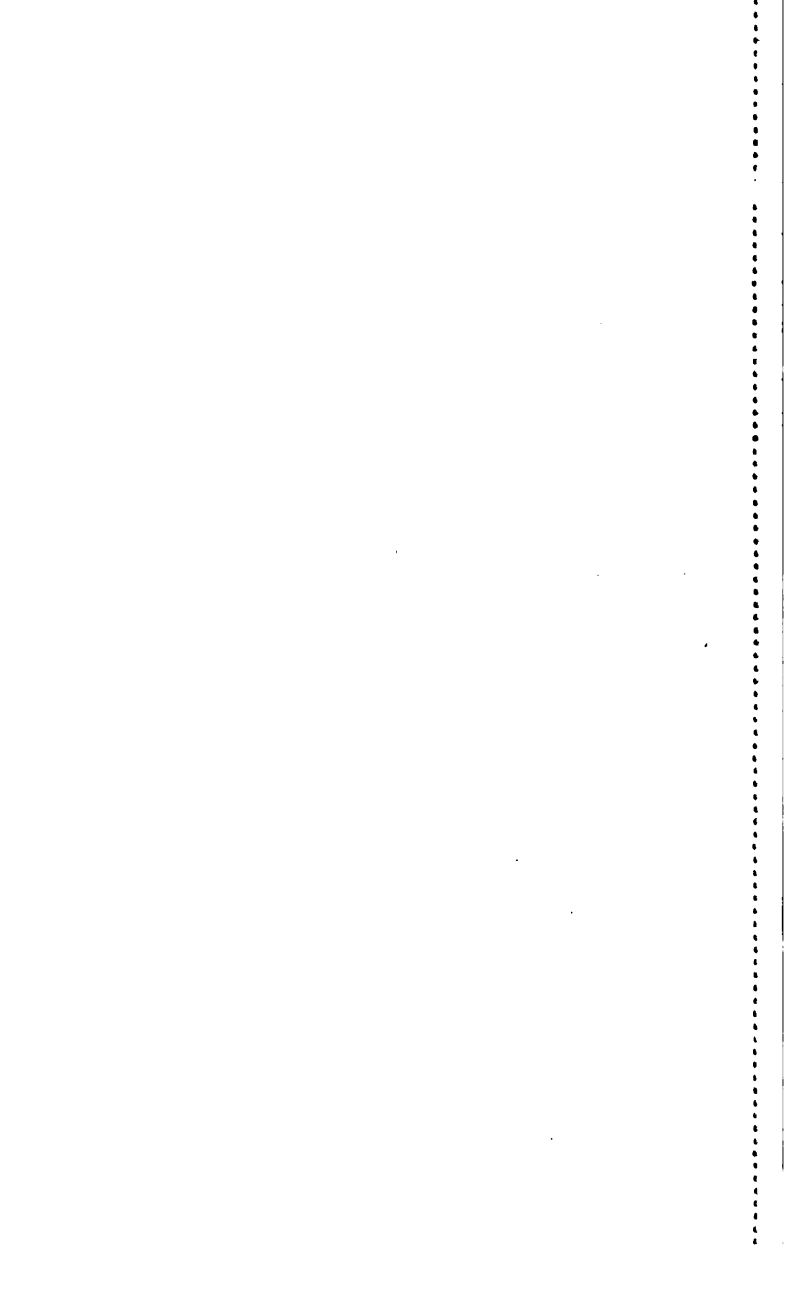
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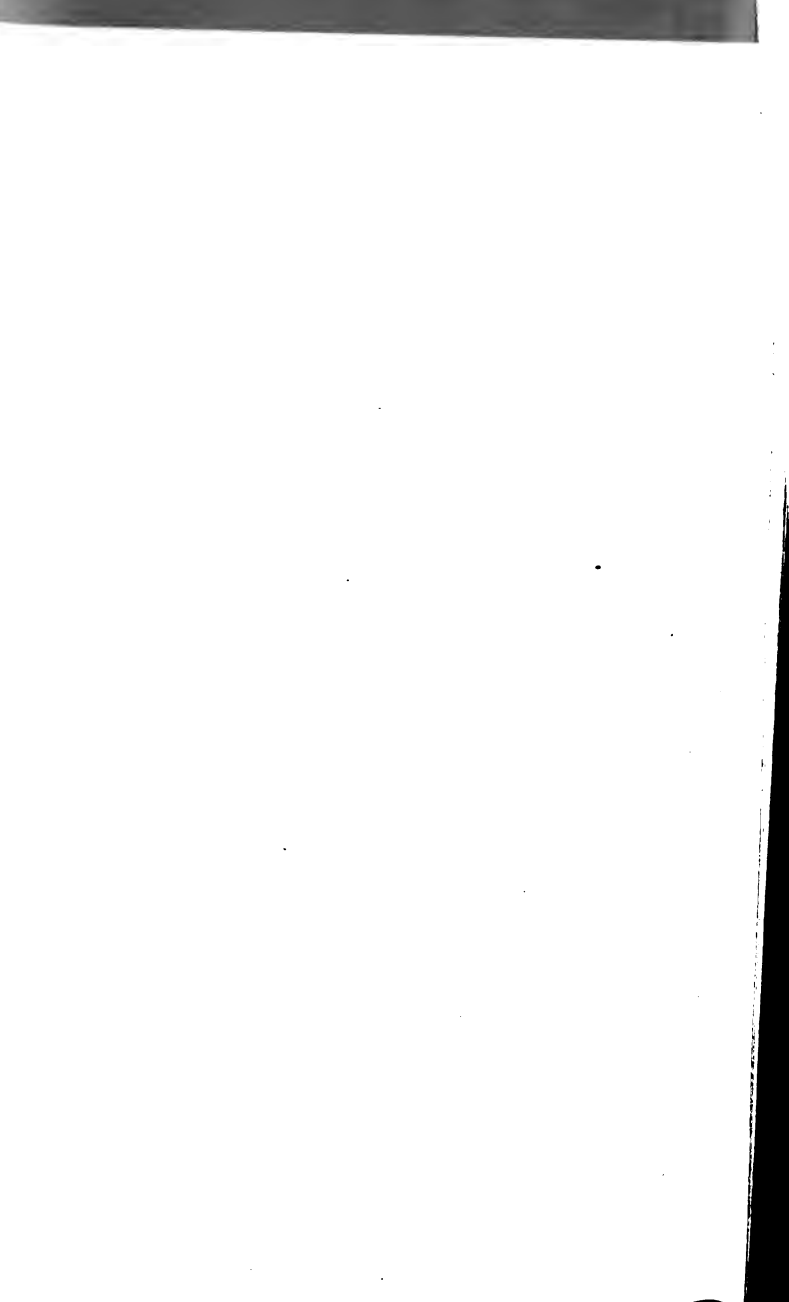
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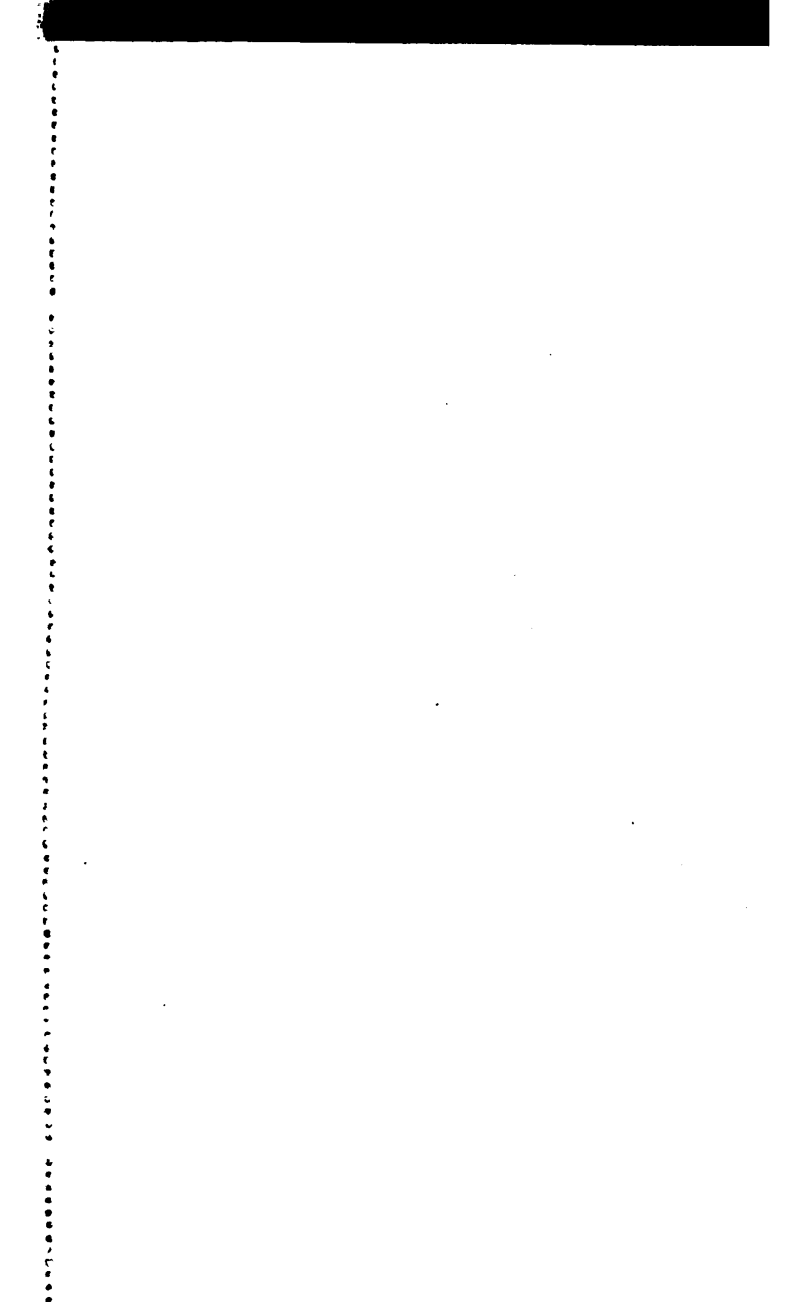
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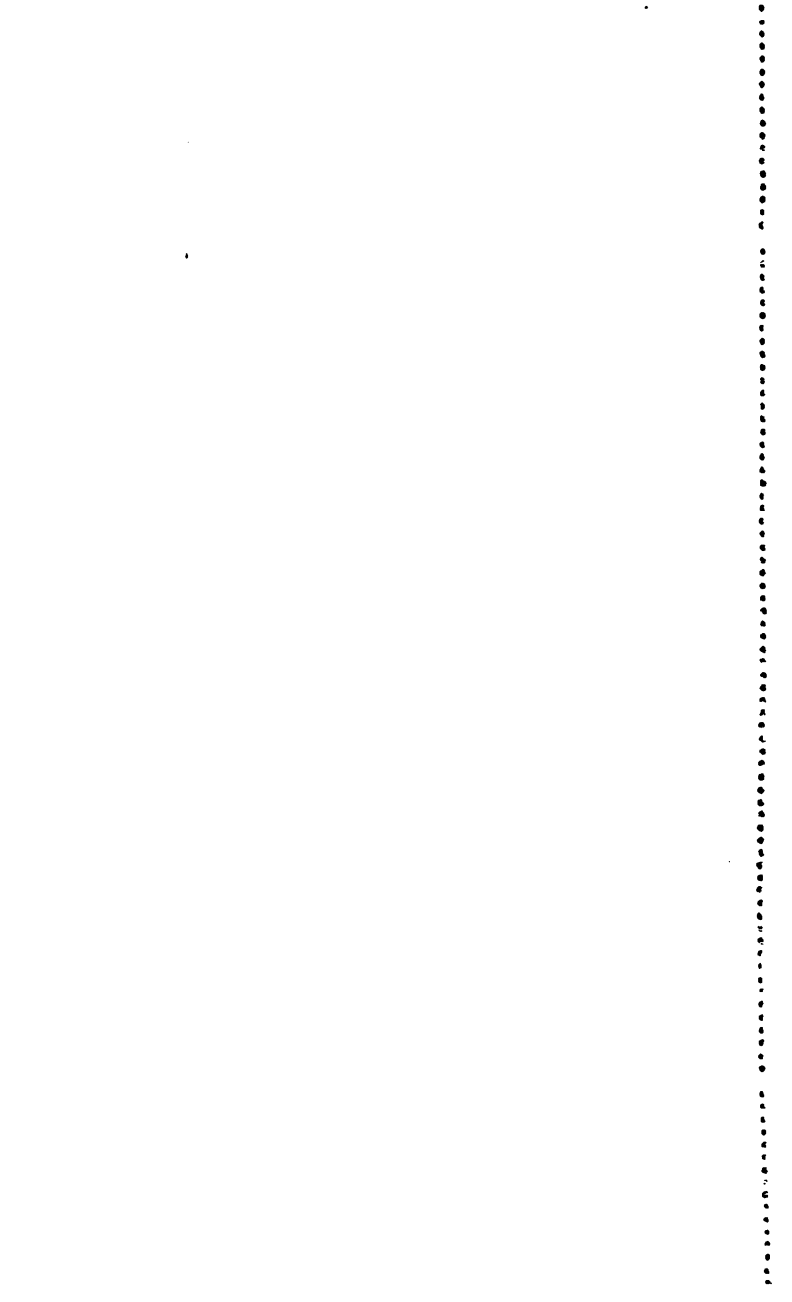


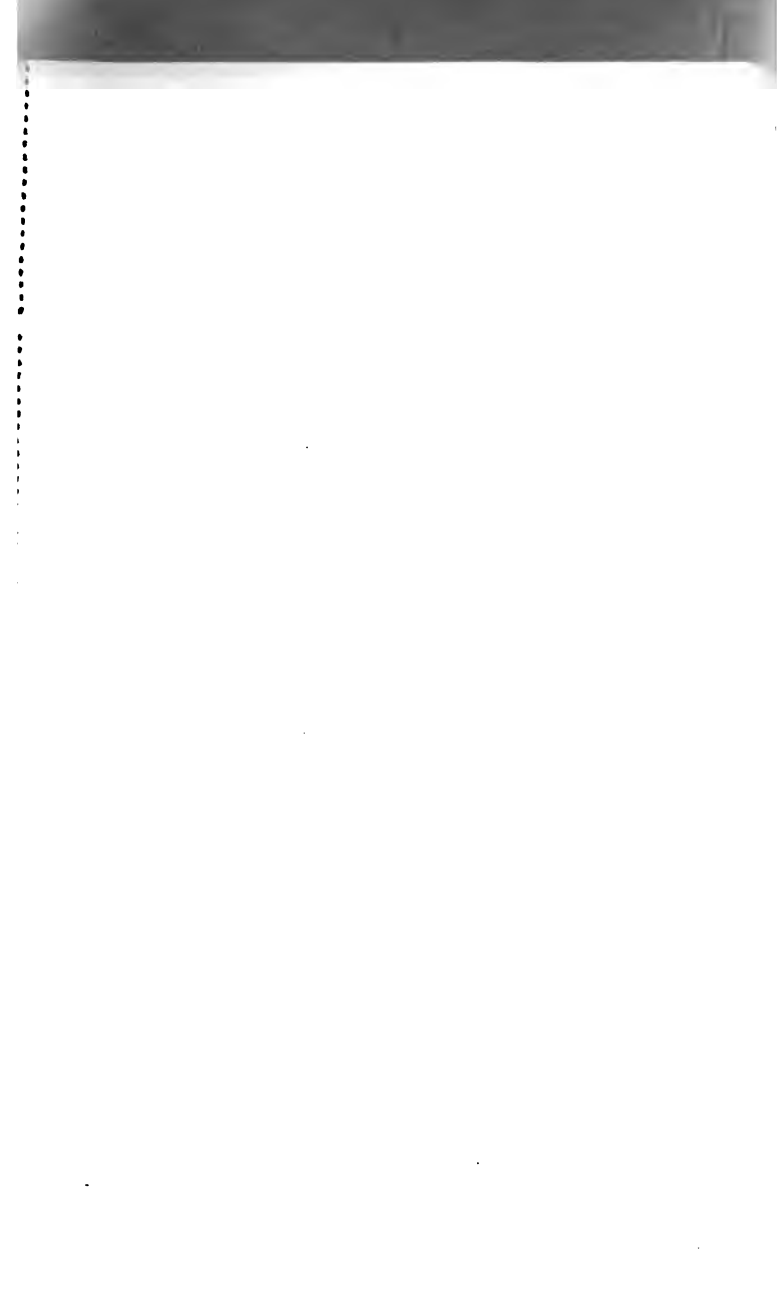


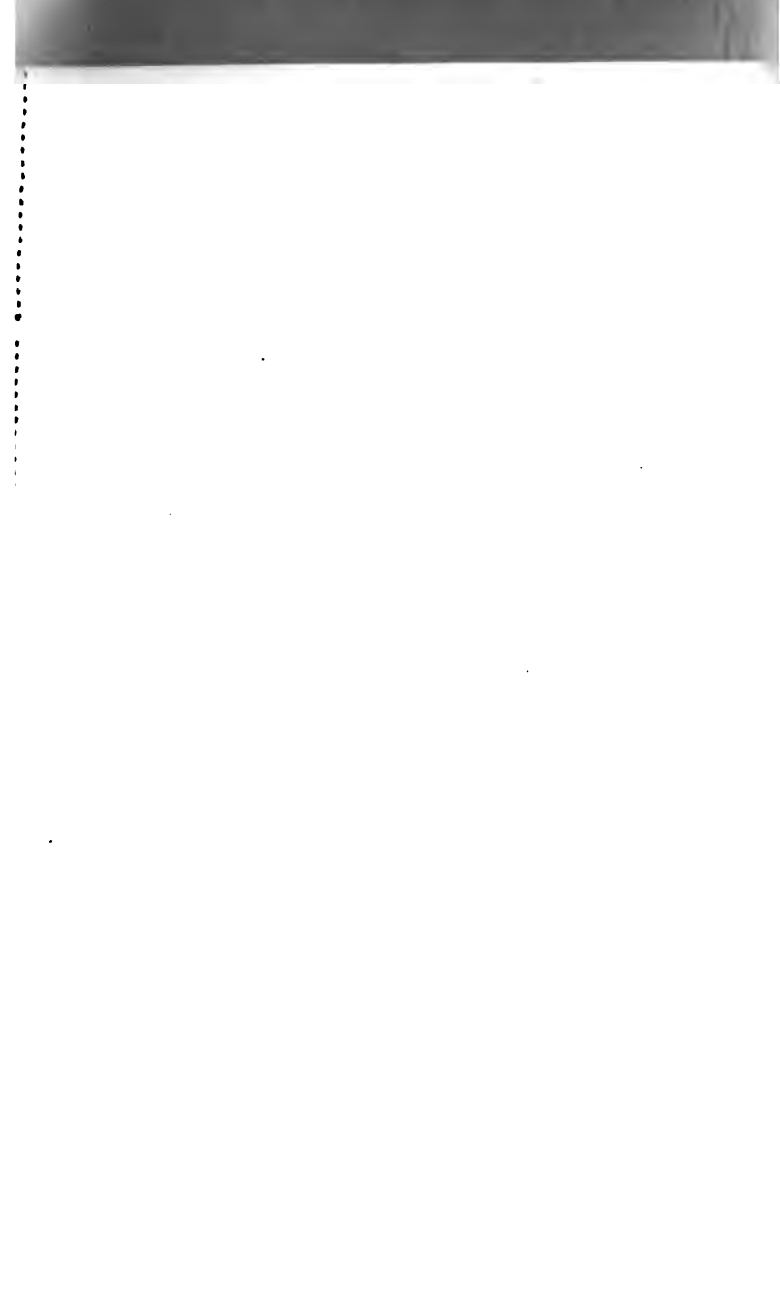




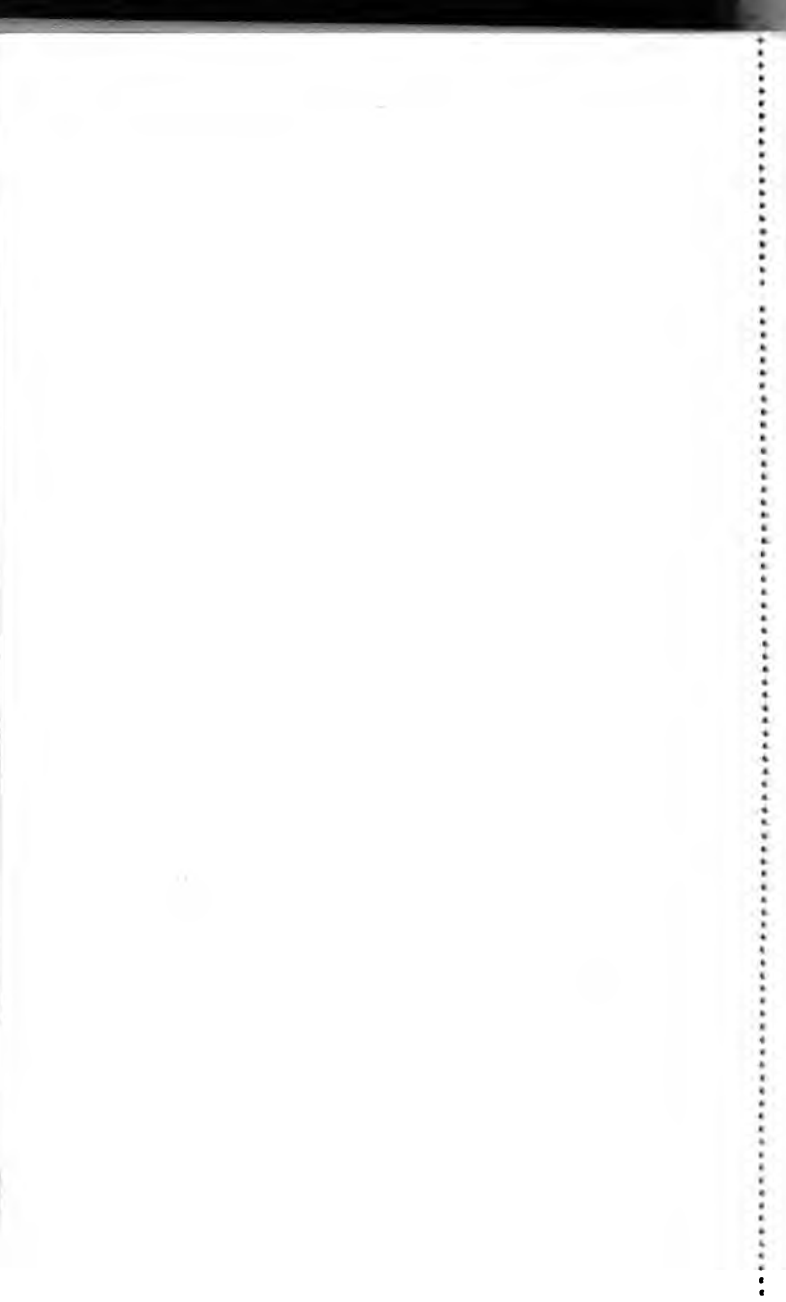


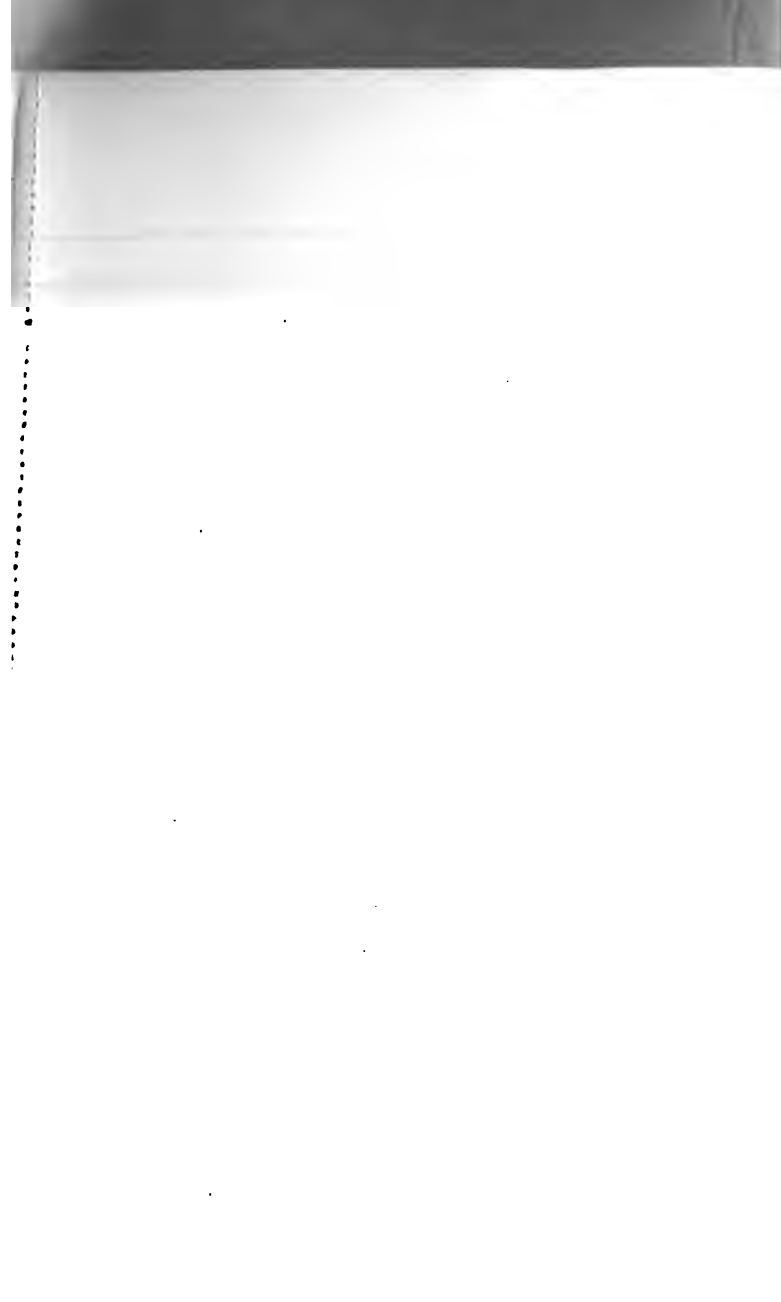


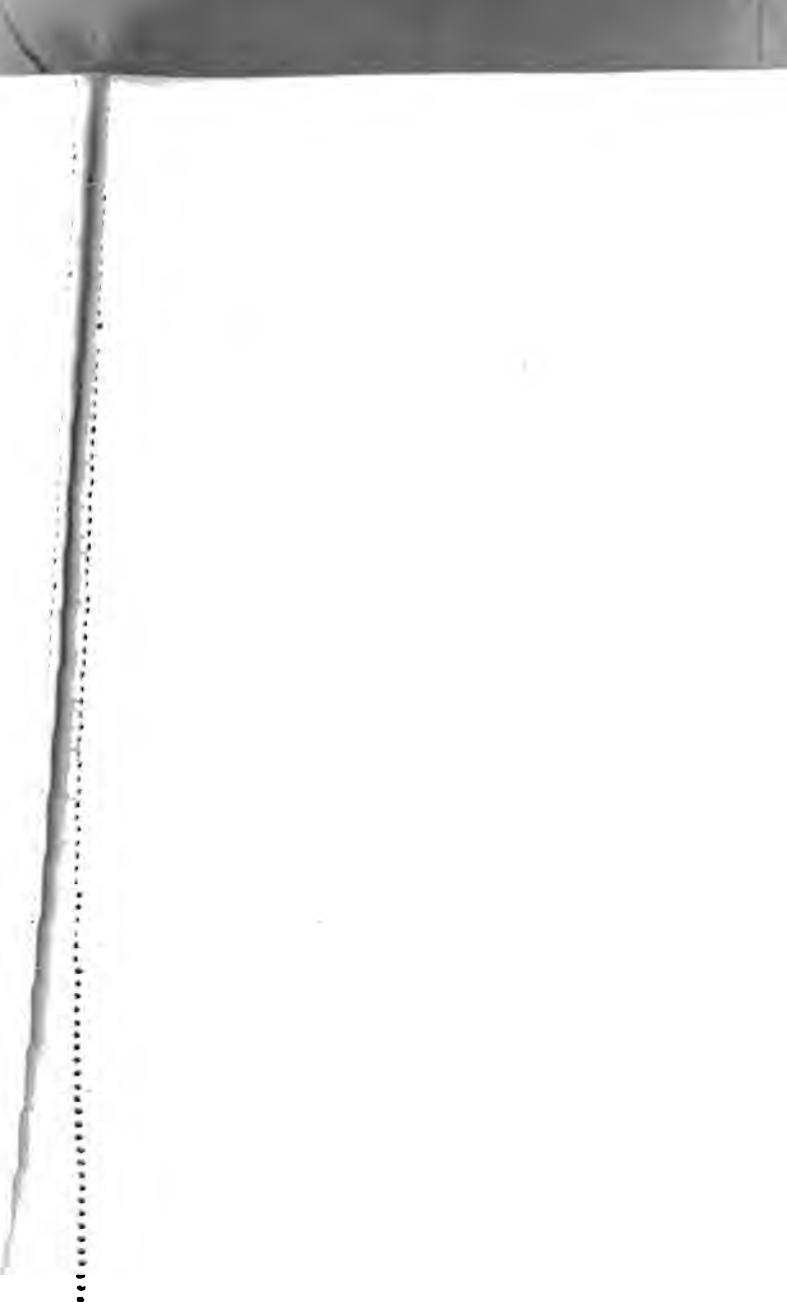


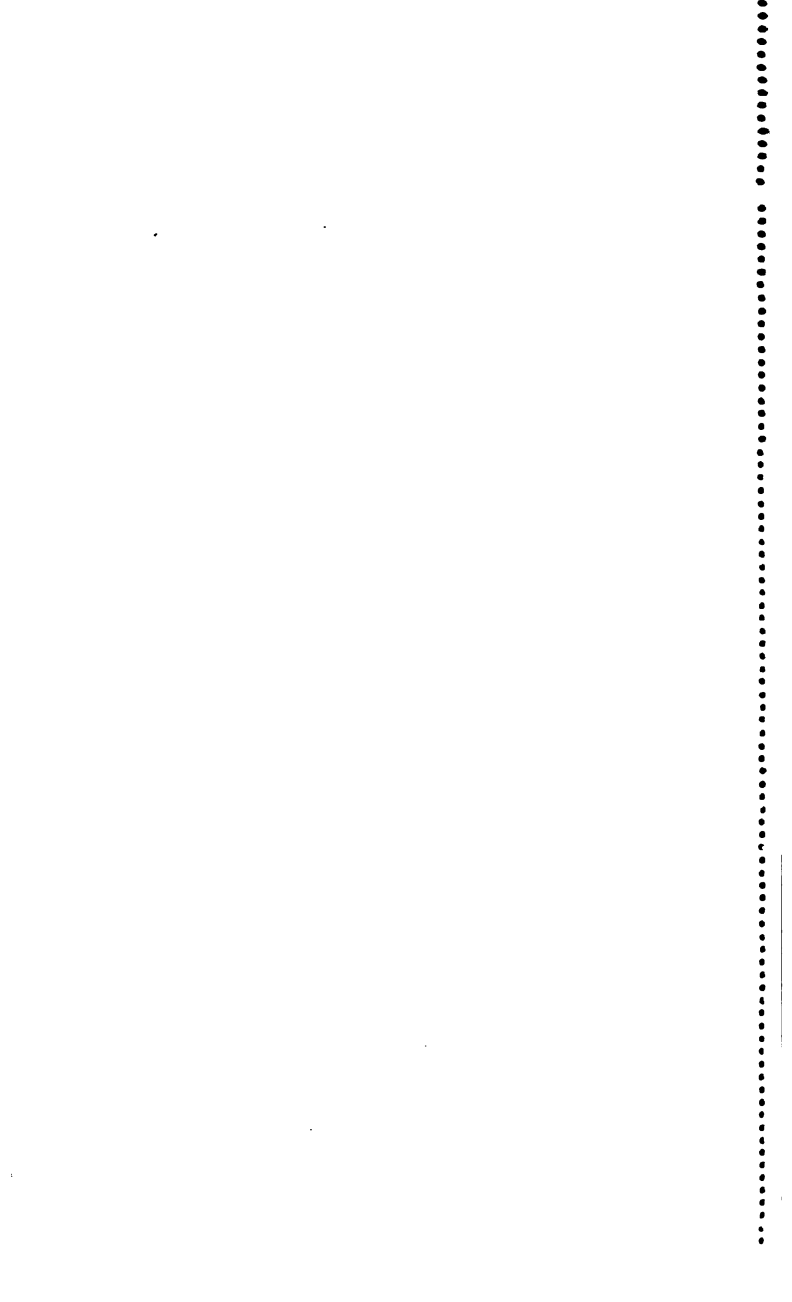




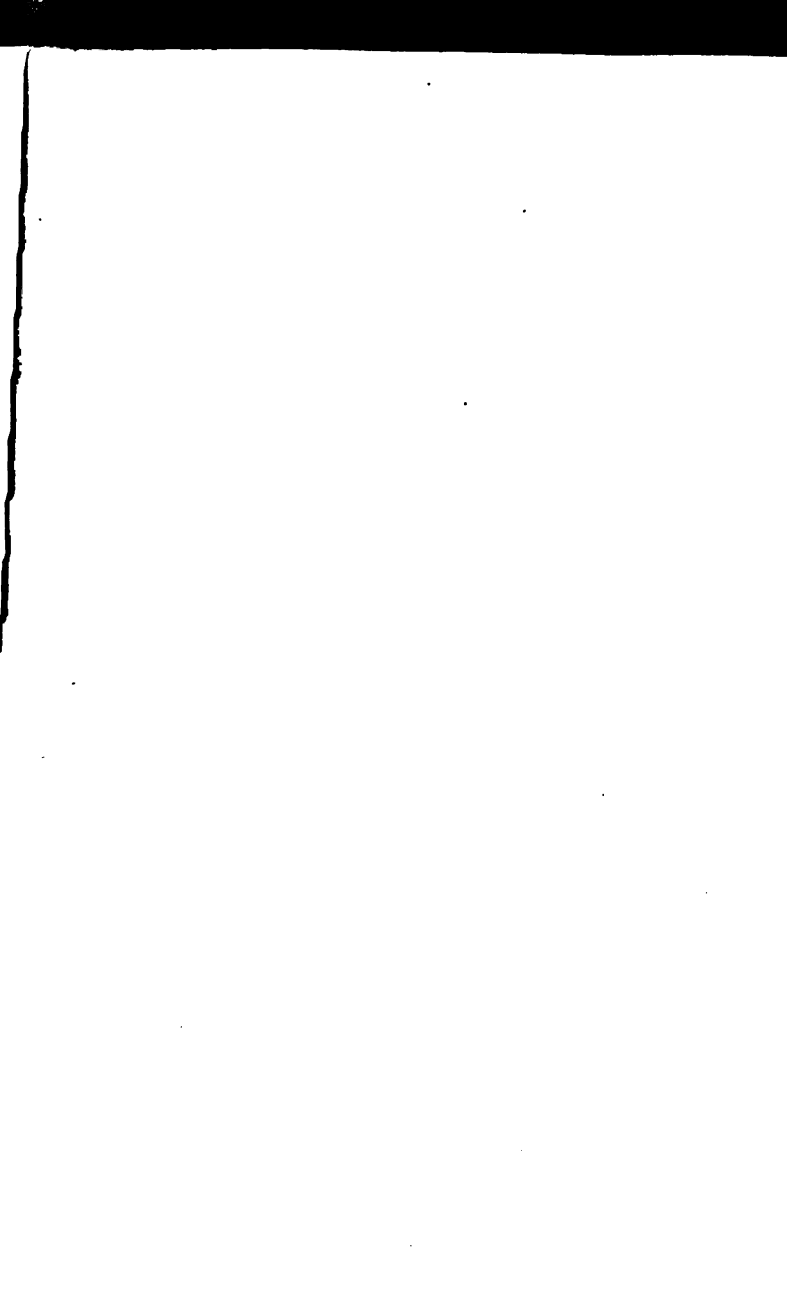


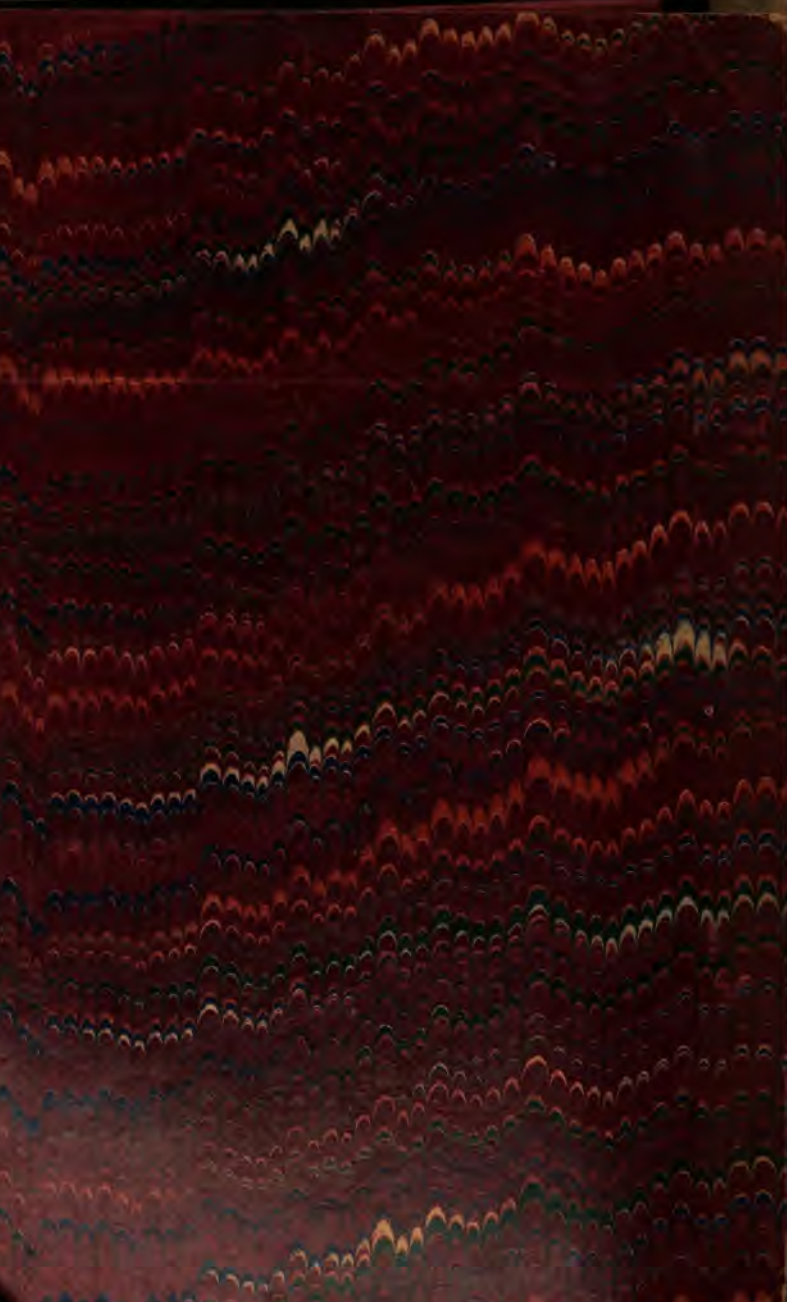






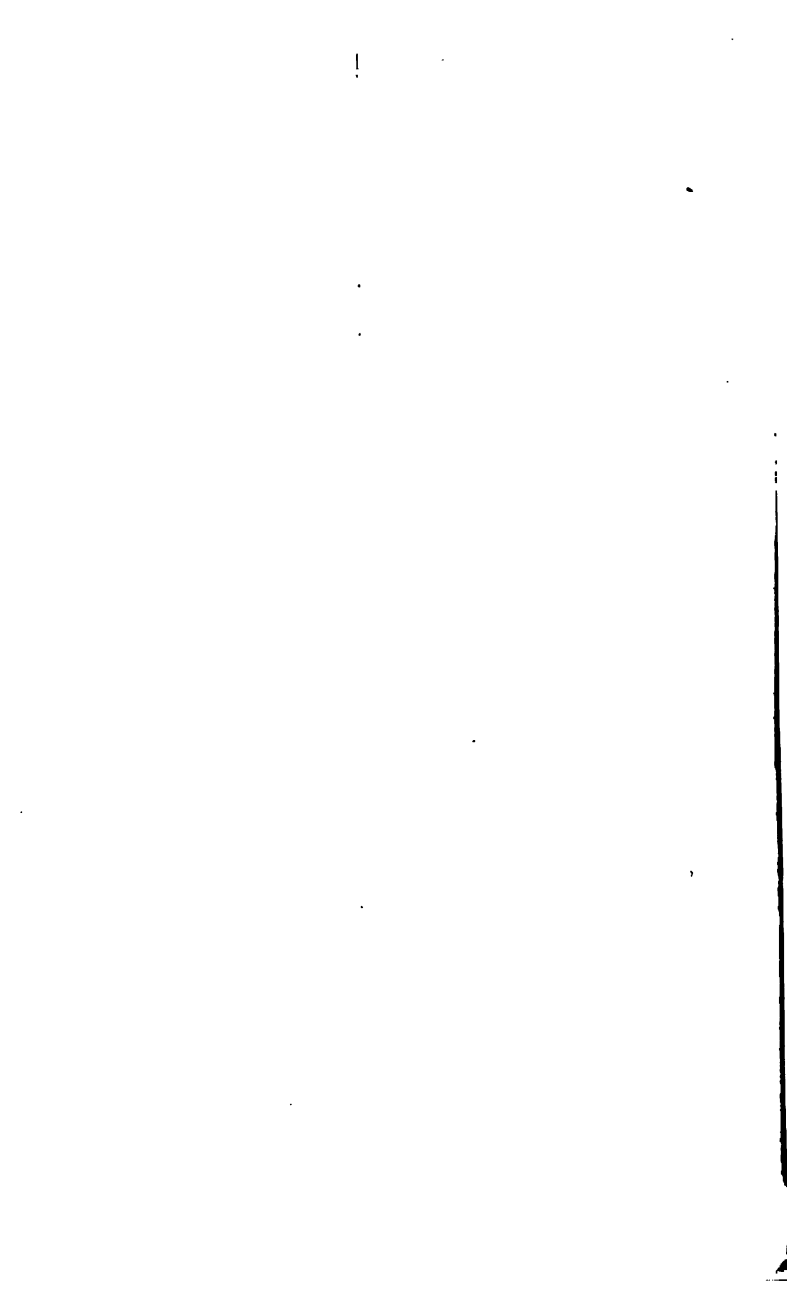




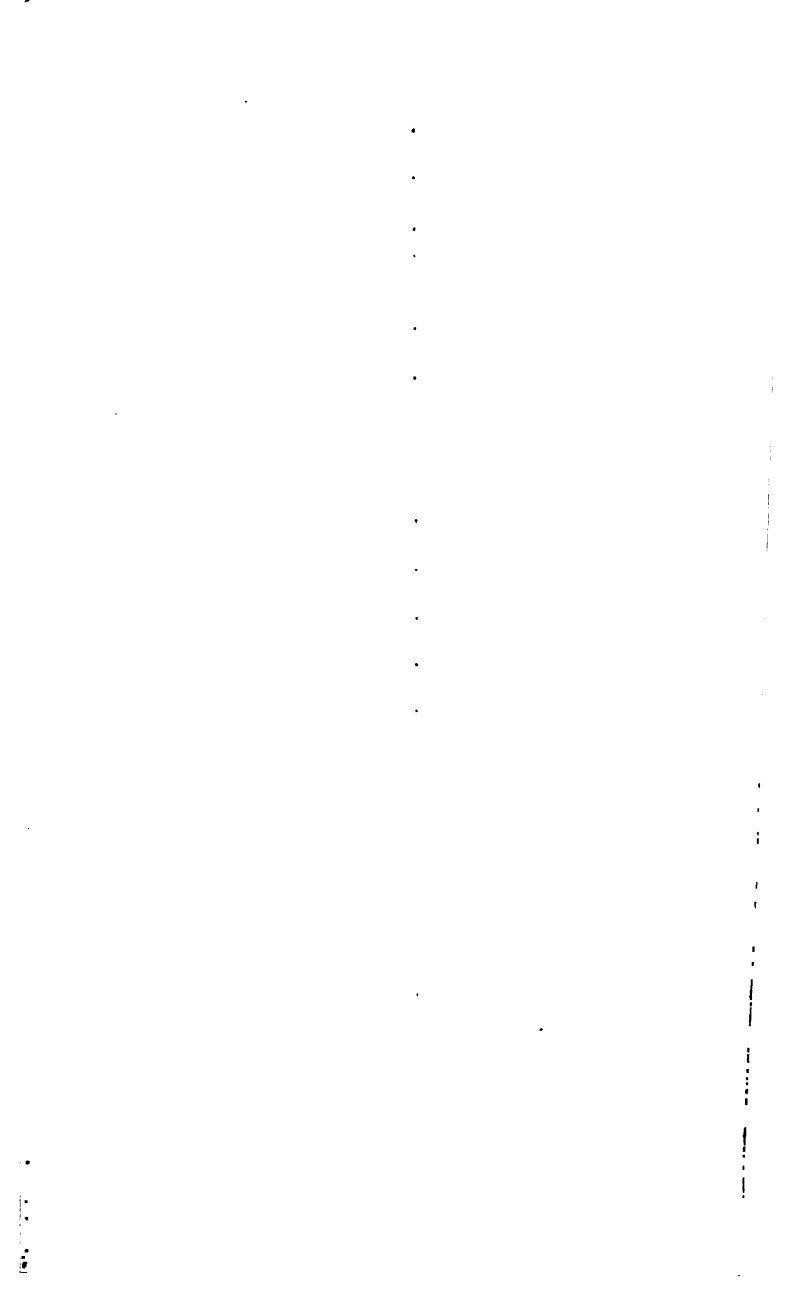




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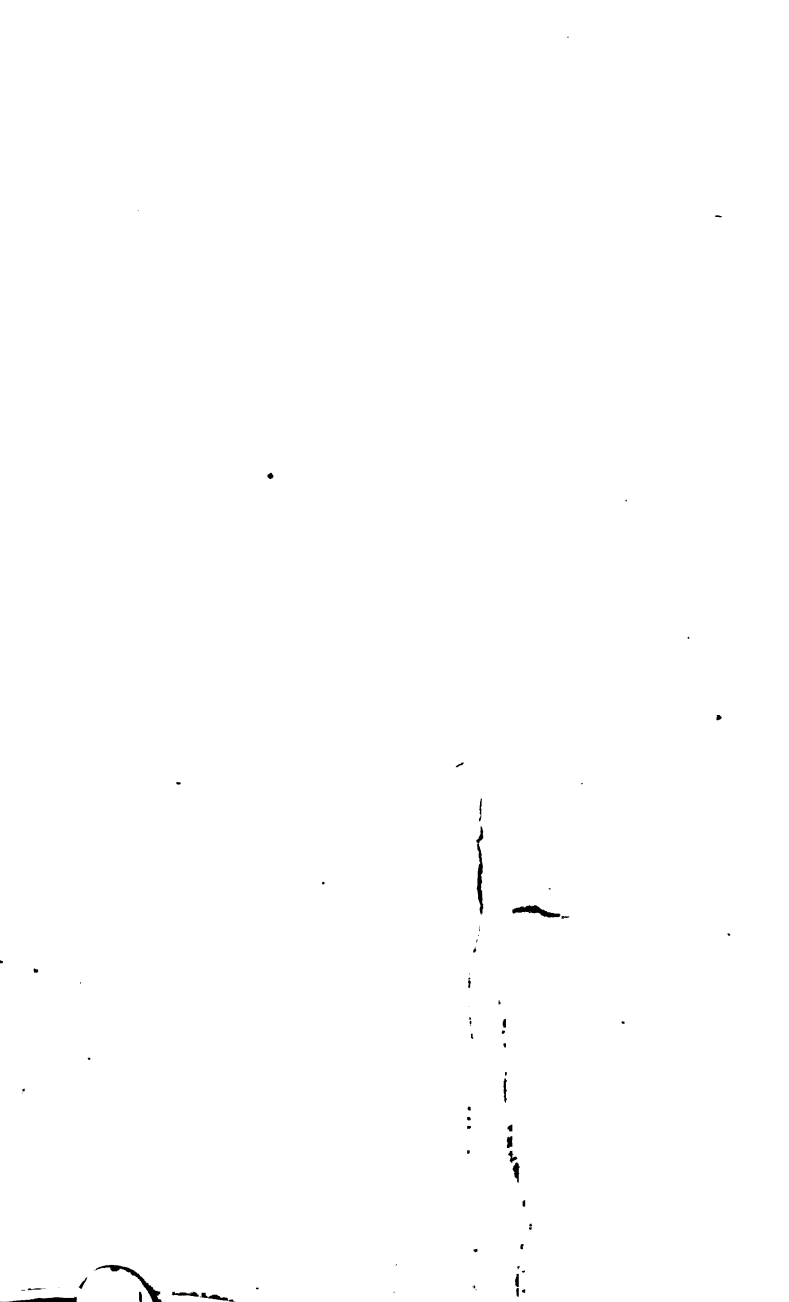
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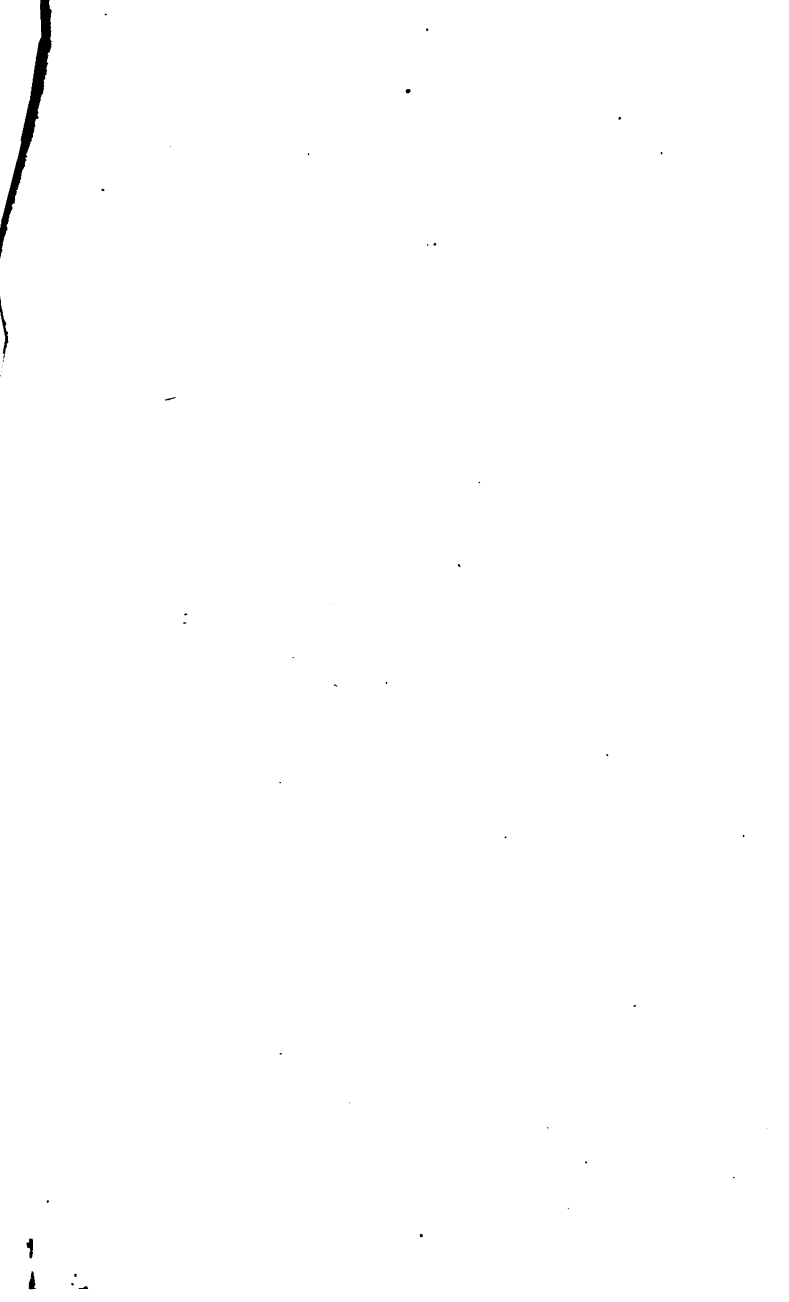
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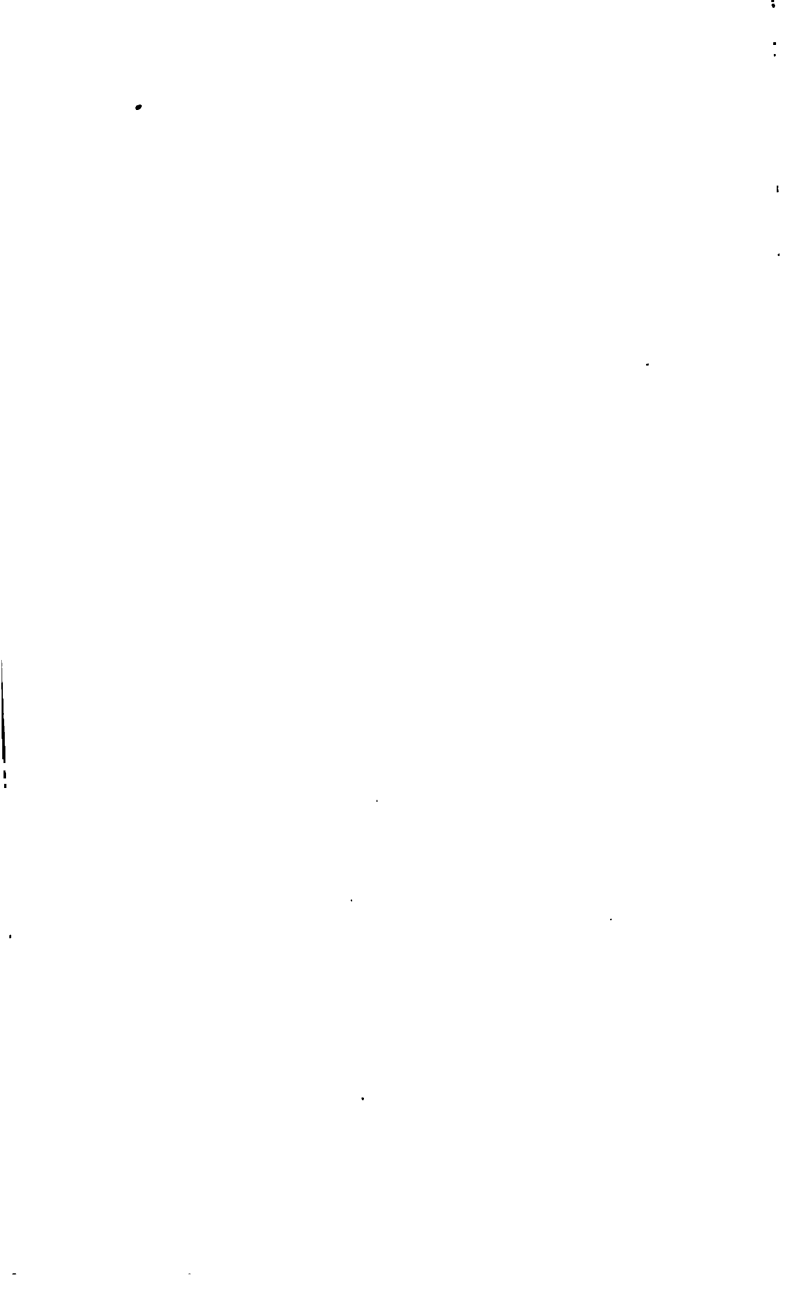
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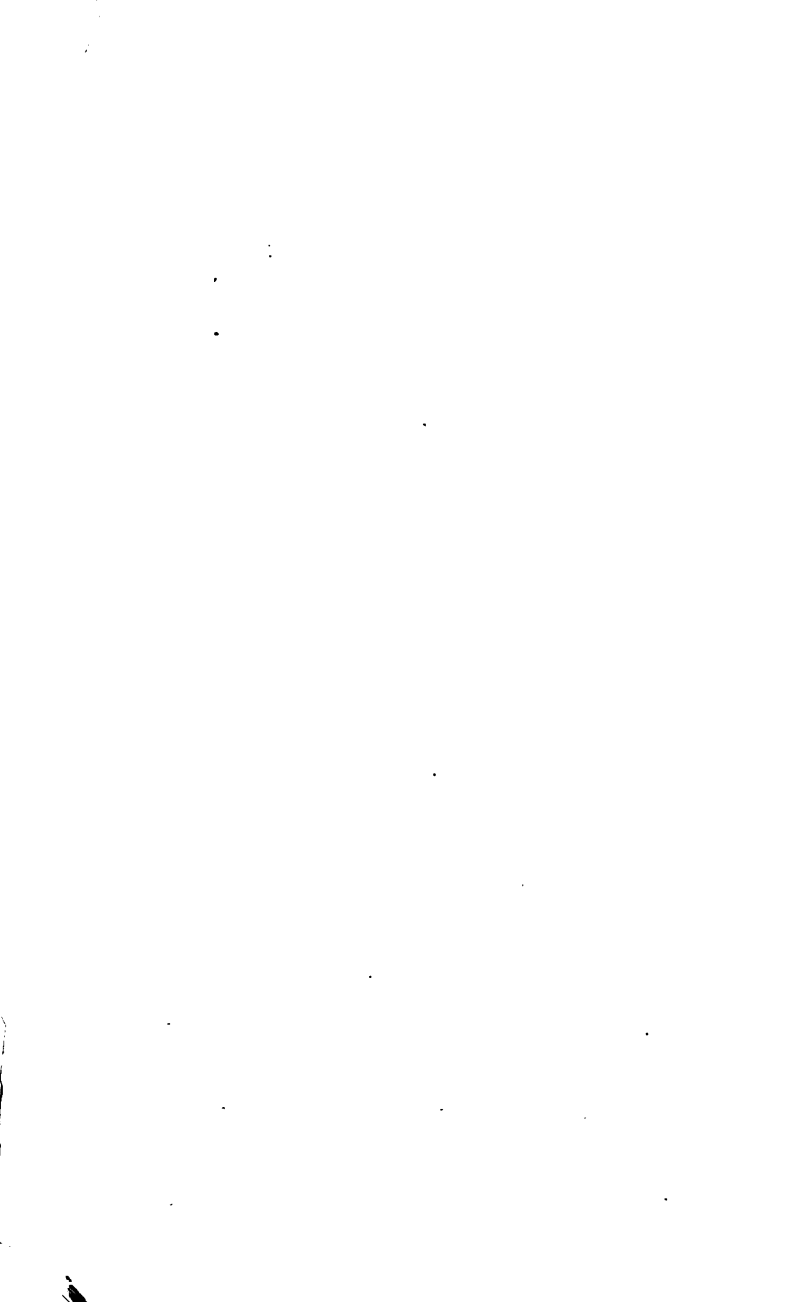






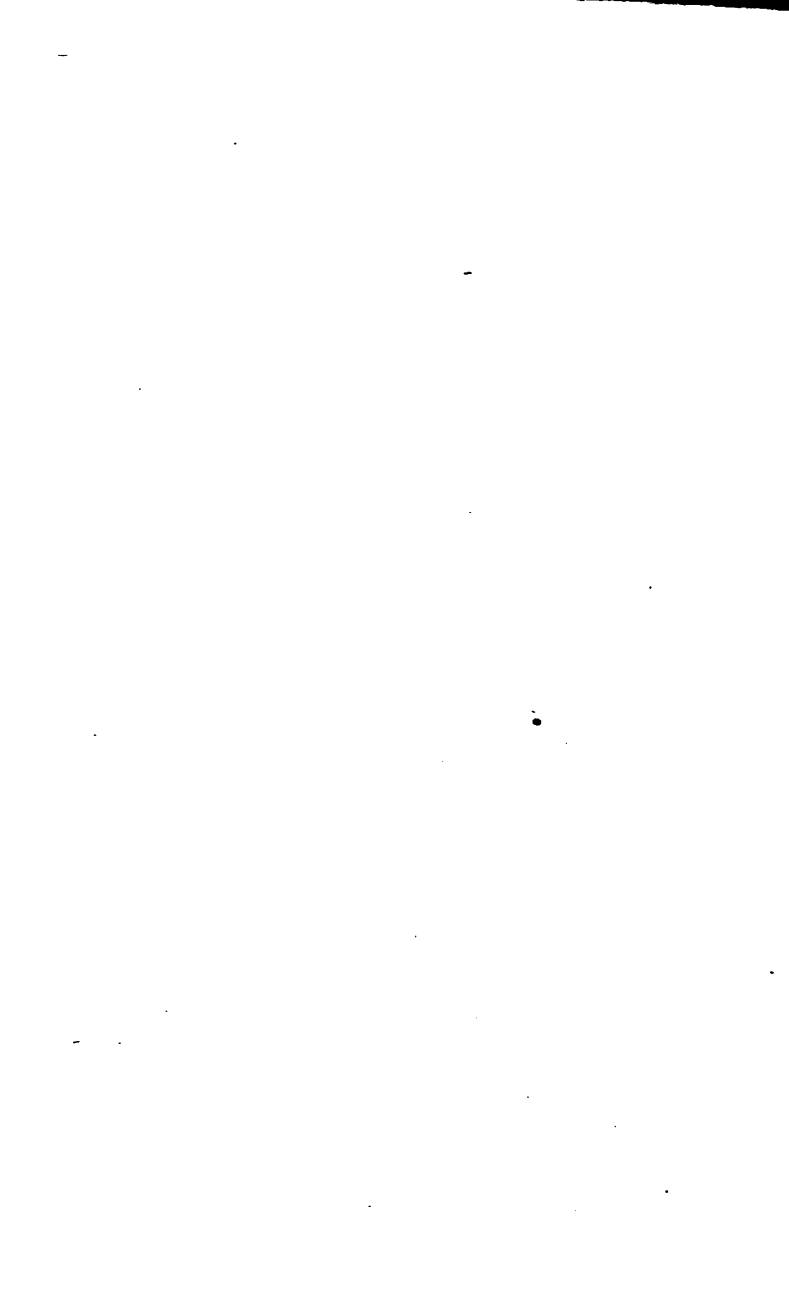














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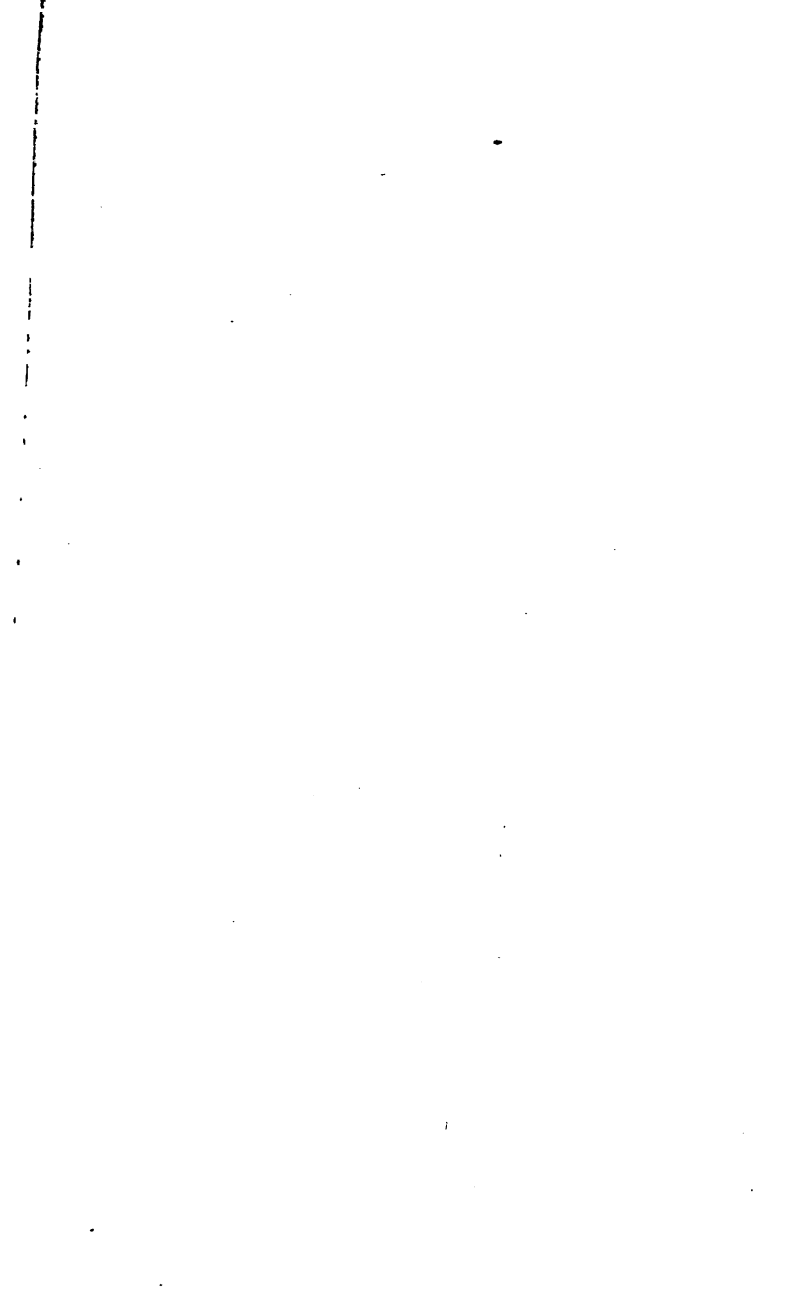
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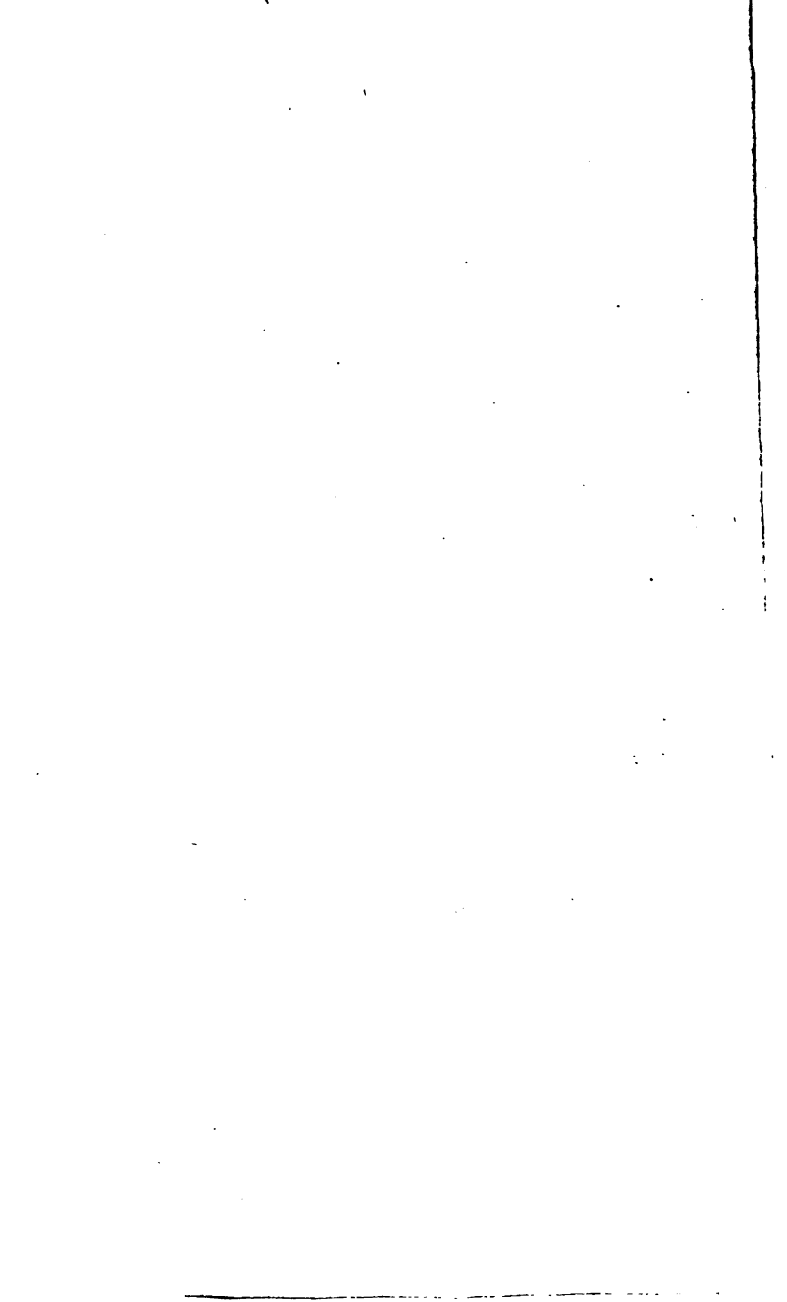


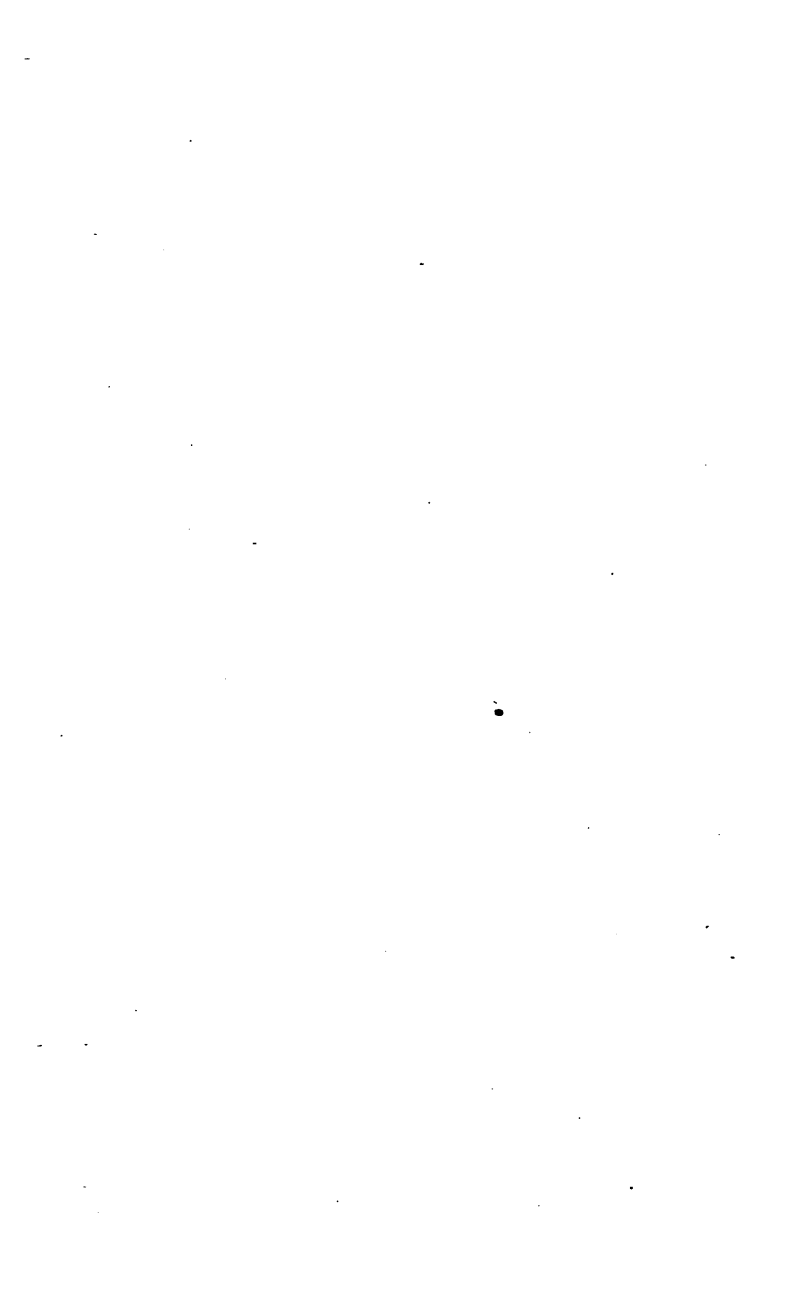


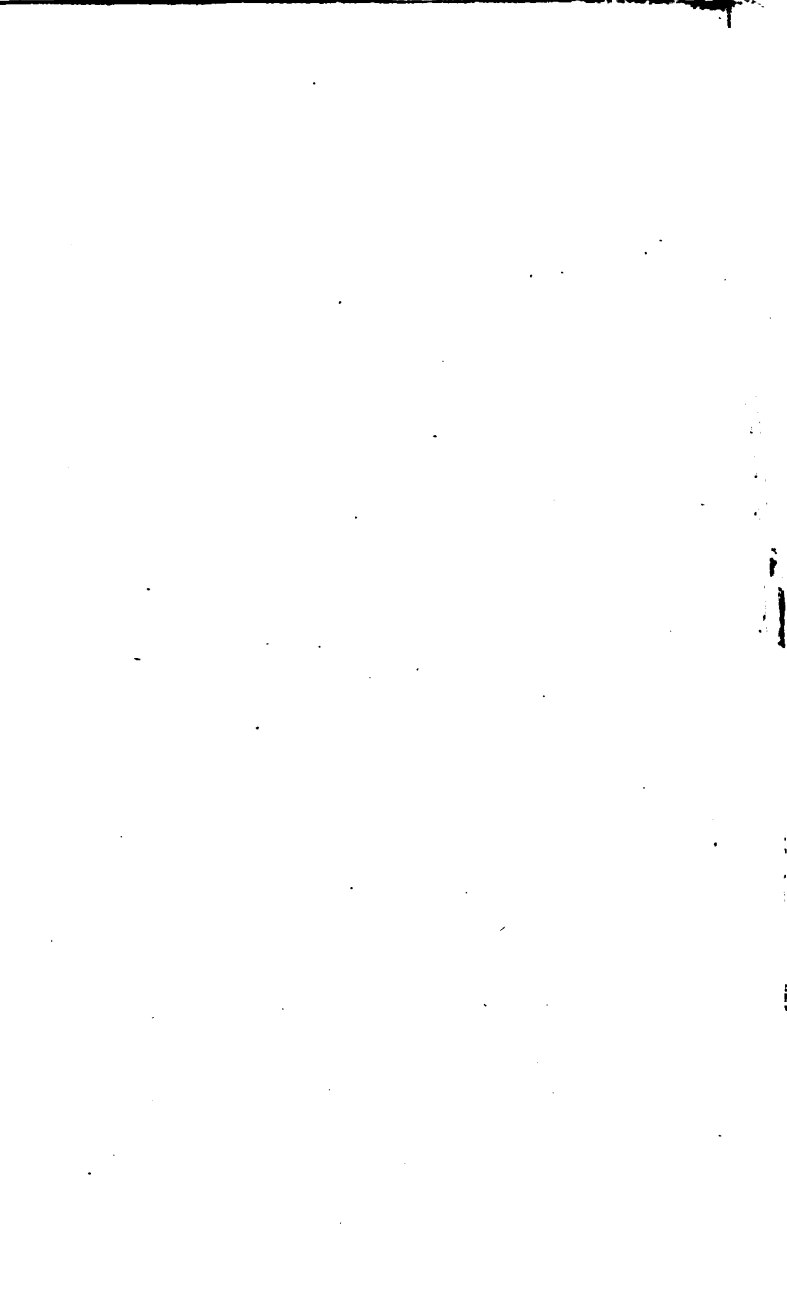


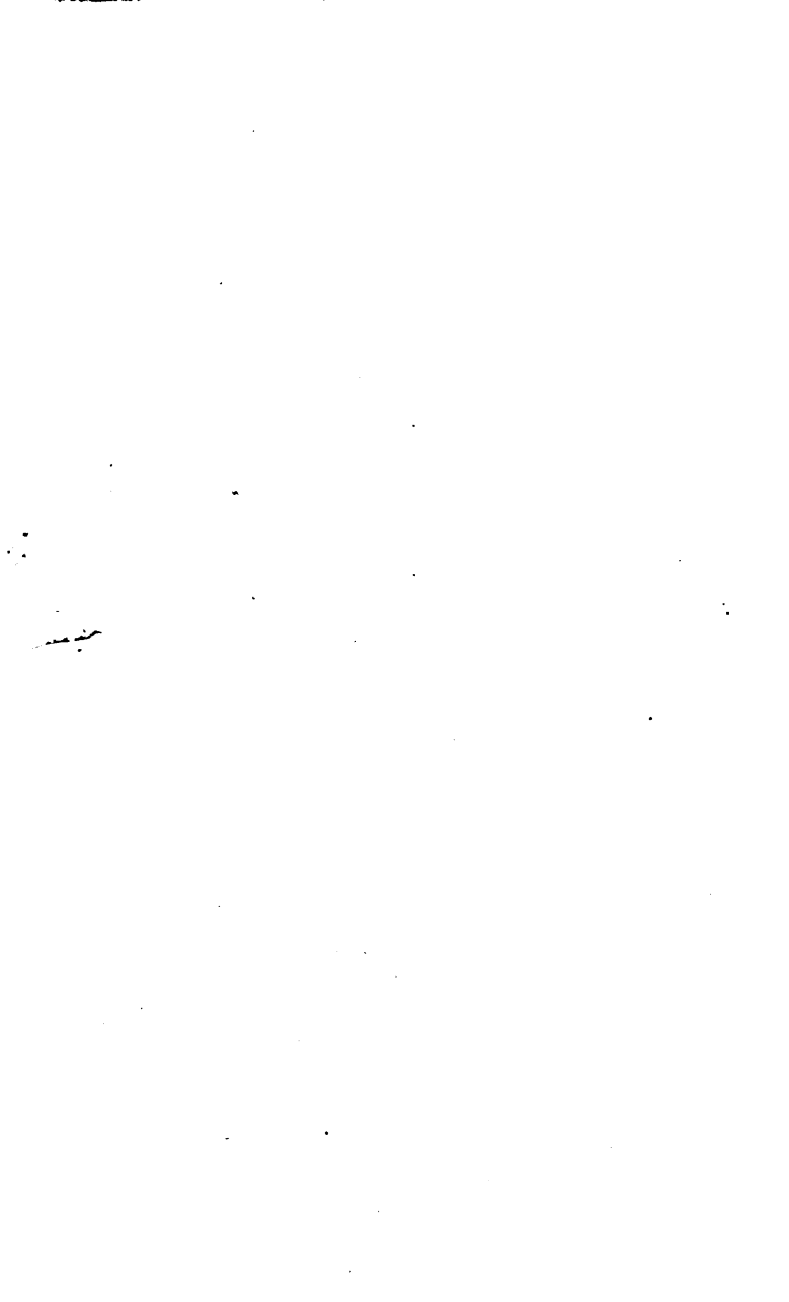




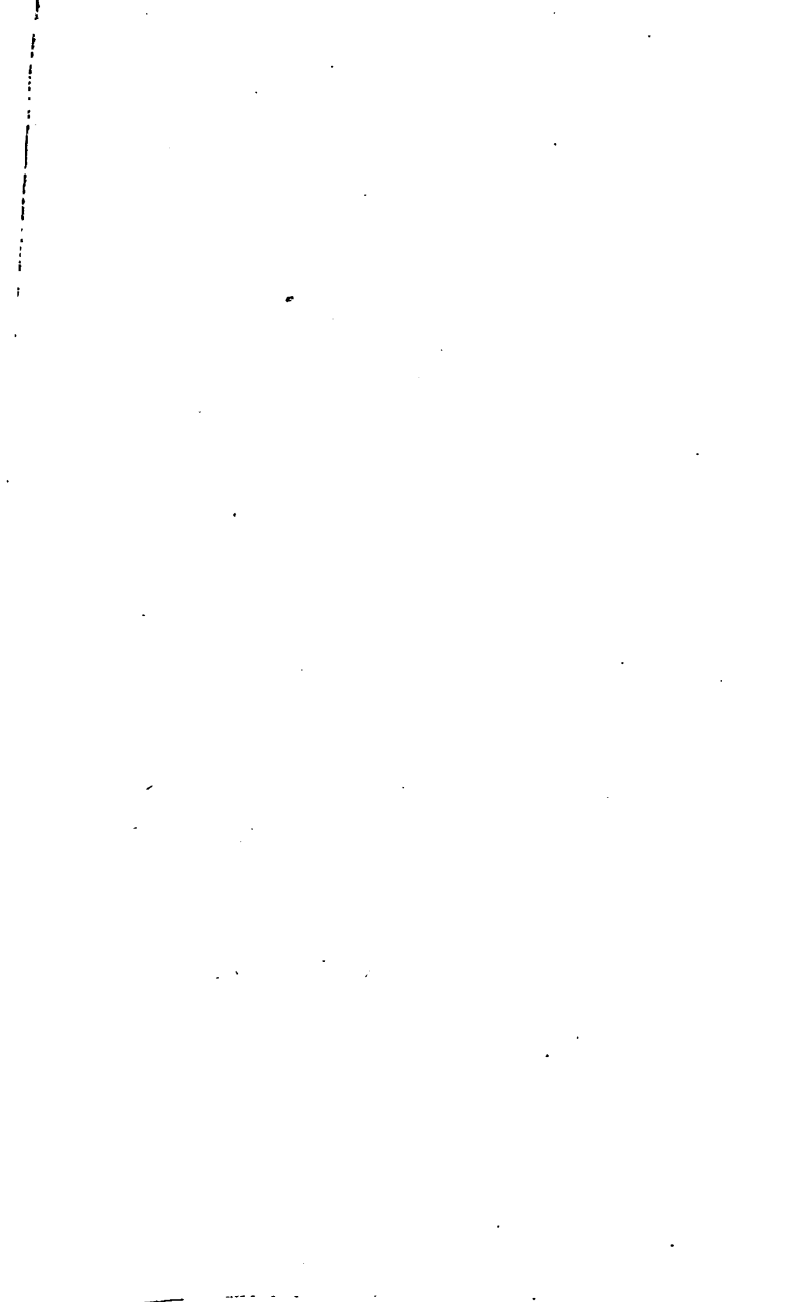








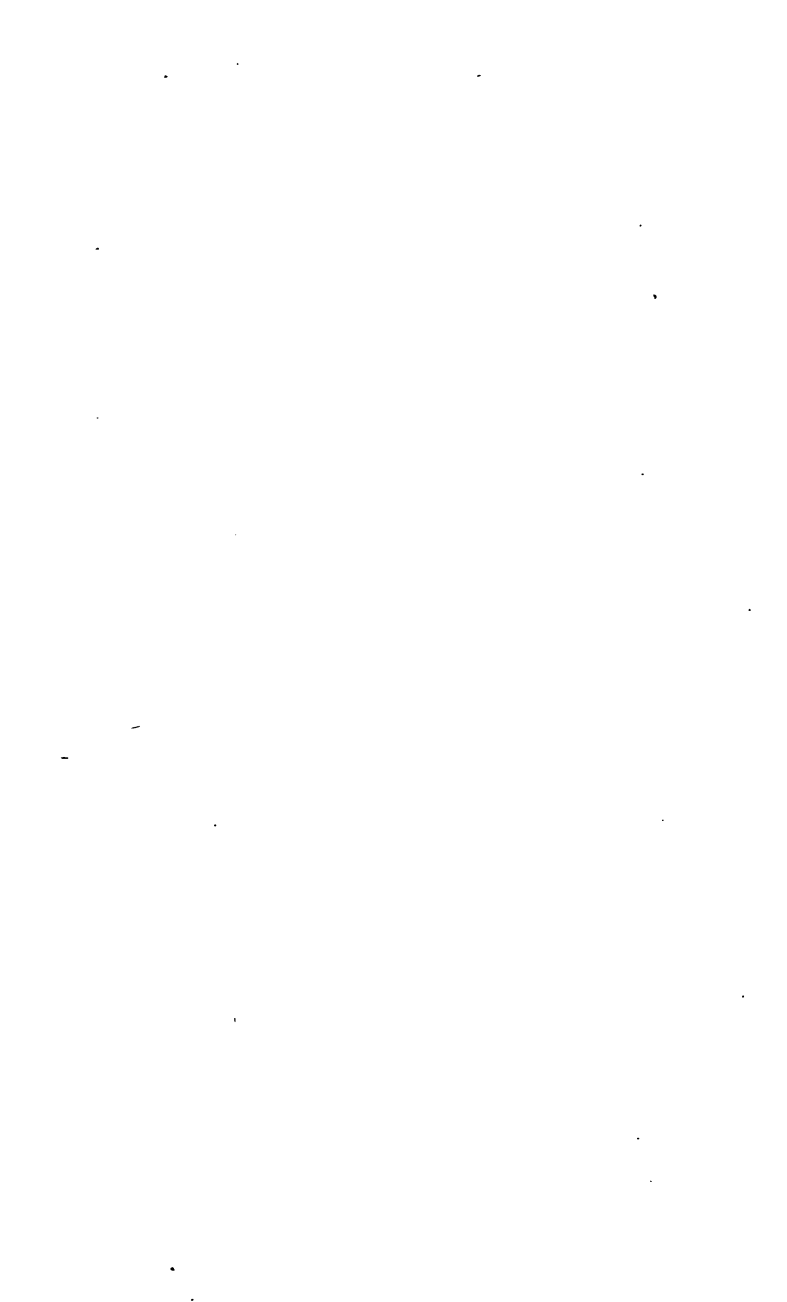










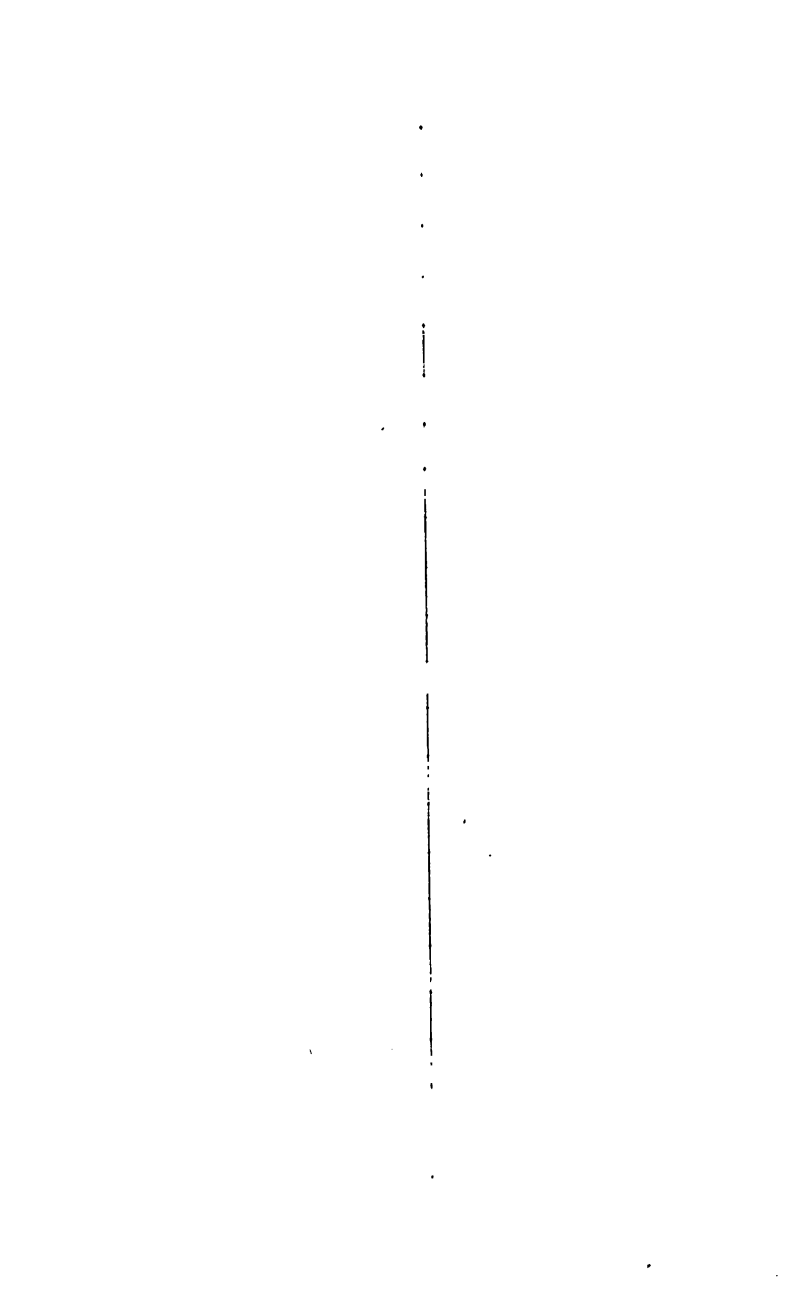






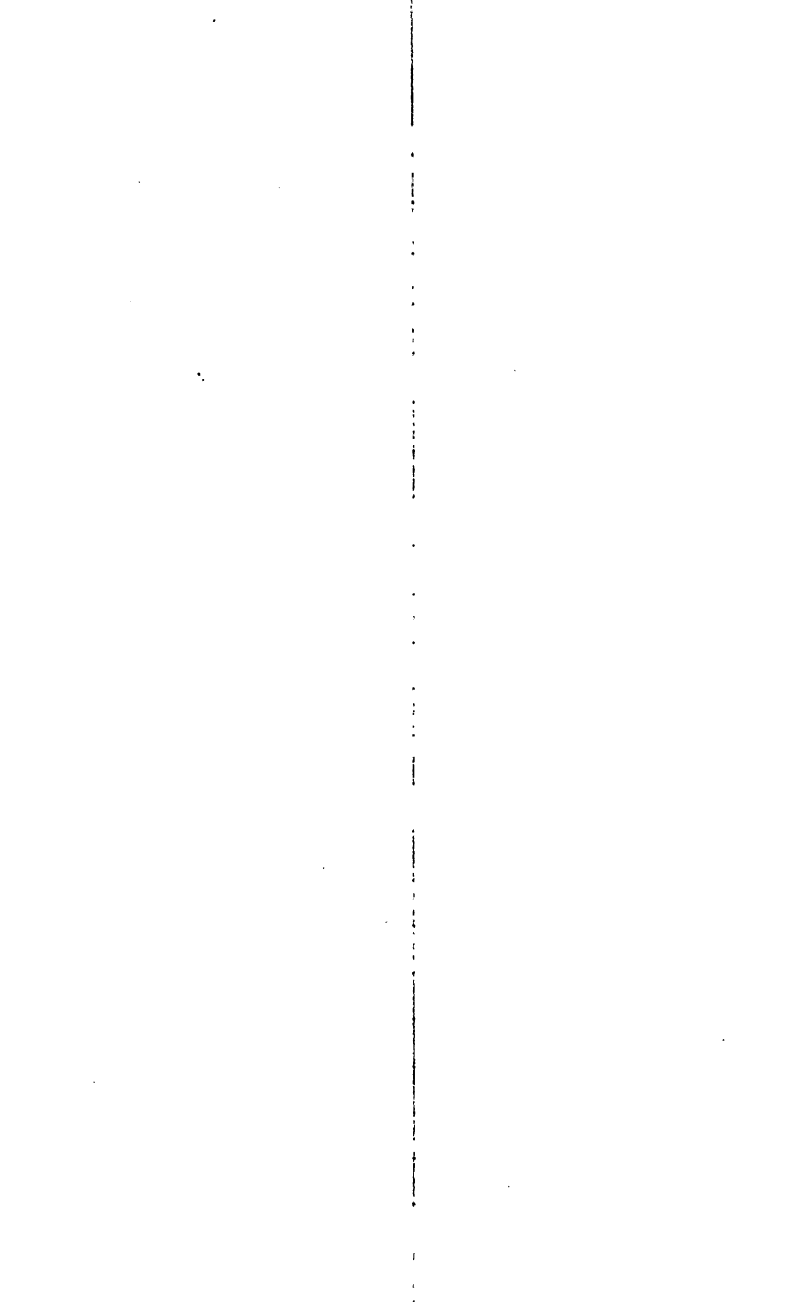


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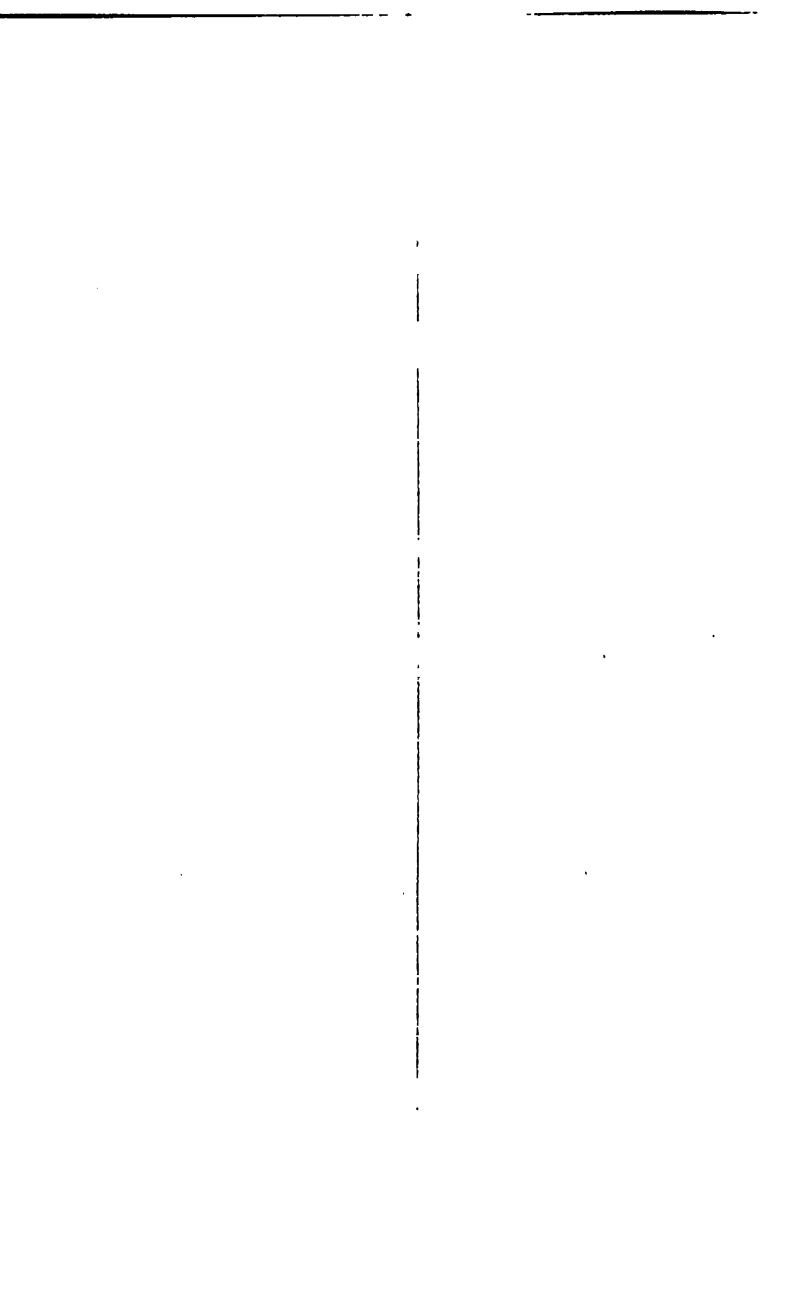


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